THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. X. No. 230—13th YEAR.] LONDON, AUGUST 13, 1861. [Subscription per Ann. 15s. in Advance 18s Credit.] DOUBLE No. Price 1s.

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Applications, stating all particulars of present and previous engagements, with copies of testimonials, to be addressed, on or before the 17th of August next, to the Directors of the Swansea Gaslight Company, under cover to the Manager.

Gas-Works, Swansea, July 19, 1861.

JAMES FERGUSON and CO., Lessees of the Auchinheath and Craignethan Gas Coal-fields (the most extensive and valuable in the parish of Lesmahago), respectfully intimate to the Managers of Gas-Works and Consumers of Gas Coal, that they are prepared to ship the best quality of the above well-known COALS at Glasgow or Leith; and also to deliver them at the railway stations upon, or connected with, the Caledonian Railway, to any extent which may be required.

Price, free on board, or delivered at the railway stations, may be learned by addressing James Ferguson and Co., Gas-Coal Works, Lesmahago.

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FOR GAS, STEAM, AND WATER.

PATENT GLASS ENAMELLED AND GALVANIZED TUBES,

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LAP-WELDED IRON BOILER TUBES.

JOURNAL OF GAS LIGHTING ONE PENNY NEWSPAPER

THREE
MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

LORD REDESDALE'S "SALE OF GAS ACT."

DRY METERS *VERSUS* WET METERS.

LONDON, February 25, 1861.

THOMAS GLOVER begs to call the attention of Gas Companies and others to a few *facts*, which, if duly considered, must lead to most important conclusions :—

1. That since THOMAS GLOVER commenced to manufacture his Patent Dry Gas-Meters (which is now upwards of 15 years), every Wet Meter Maker of any importance in England has been compelled to manufacture Dry Gas-Meters; and in the JOURNAL OF GAS LIGHTING, of date of 12th of February, 1861, Messrs. William Parkinson and Co., successors to the late Samuel Crossley, advertise that they "intend manufacturing *Dry* as well as" Wet Meters, and it is worthy of particular notice that they intend to do so "after 40 years experience in manufacturing Wet Gas-Meters of such a quality that has enabled them, as they say, to maintain a superiority over all other; and this, be it also particularly noticed, after they had advertised in the JOURNAL OF GAS LIGHTING, January 29, 1861, "their improved low-spouted Gas-Meter with new patent float arrangement, which entirely overcomes the difficulty experienced by ordinary Wet Meter."

2. That it is quite consistent with THOMAS GLOVER'S knowledge that Wet Gas-Meters, called "low-spouted" or "compensating Wet Meters," have already been proved to be incapable of continuous working or registration, and for this reason the manufacturers of these Meters have been induced to seek the repeal of Lord Redesdale's (righteous) Sale of Gas Act.

3. That every year the Patent Dry Gas-Meter manufactured by THOMAS GLOVER has risen in favour with Gas Companies and Gas Consumers, placing him in the proud position of being the largest manufacturer of Gas-Meters in the country.

THOMAS GLOVER guarantees his Patent Dry Gas-Meters to meet all the requirements of the "Sale of Gas Act," to give accurate and unvarying registration with steady lights; and, from their peculiar construction, cannot be tampered with, and may be fixed in open situations even above or below the level of the lights. They work with less pressure than Wet Meters, and are not affected by the most severe frost.

THOMAS GLOVER guarantees to uphold all Meters sold by him for 5 years free of expense to the purchaser, or for a trifling per centage per annum will contract with any Gas Company to uphold their Meters of his manufacture for a series of years; and, at the conclusion of such contract, to leave the Meters all in perfect working order.

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(SUCCESSORS TO SAMUEL CROSLEY),

PATENT WET AND DRY GAS-METER MANUFACTURERS, &c.

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W. P. and Co. invite especial attention to this Meter, which entirely overcomes the difficulty to which ordinary Wet Meters are subjected, owing to the short range of the Float, which is necessary, in order to meet the requirements of the Sale of Gas Act.

"It is well known that in Meters constructed so that the valve will close when the water is drawn off to such a point as to render them 3 per cent. slow the lights are liable to be extinguished by the closing of the valve by a sudden increase of pressure. To meet this difficulty, Mr. Pinchbeck has invented an ingenious and simple arrangement by which the action is reversed, and any such increase of pressure, in his Meter, raises the value instead of depressing it. The fact of the improvement having been adopted by Messrs. W. Parkinson and Co. is a sufficient guarantee that it practically and effectually remedies the inconvenience it is designed to meet."—JOURNAL OF GAS LIGHTING.

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TEST GASHOLDERS, EXPERIMENTAL METERS, EXHAUSTER REGULATORS,

MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

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NOTICES.

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THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, AUGUST 13, 1861.

NOTES UPON PASSING EVENTS.

THE close of the session of 1861 has not realized the promise of its commencement in metropolitan improvements. Little has been done, although the foundation has been laid for a good deal of work next year. The Palace of Justice Bill, with all the consequent improvements in the Strand, has been hung up in the House of Lords. The Lords have scruples about dealing with the Suitors Fund—a case of unnecessary and purely imaginary conscientiousness, which, it is to be hoped, another session will extinguish. The bill for sweeping away Holywell Street—a private speculation, in very bad hands, it must be admitted—was easily defeated—perhaps wisely—but on the absurd plea that it is not right to invest private speculators with compulsory powers of purchasing property for building speculations. The Thames embankment commission, which superseded and crushed the Thames Embankment Railway Bill, have reported too late for action this year; and the corporation of the City of London, in like manner, must wait for the opening of Parliament next year before they can obtain authority to rebuild Blackfriars Bridge. In these several delays, there is little to regret, except in that of the plan for the concentration of the courts. The Strand is so great a thoroughfare, Temple Bar is so great a nuisance, and the architecture of nearly the whole line from Charing Cross to St. Paul's is so thoroughly disgraceful, that we are sorry to have the least delay in an improvement that would have undoubtedly acted most usefully as an encouragement, and an example for continuing street improvements from St. Paul's to Charing Cross. It is very true that there is a rival and tempting plan for converting the wilderness of Lincoln's Inn Fields into the site of a Palace of Justice; but we hold to the Strand, not only because the Strand is the great highway of London, but because Lincoln's Inn Fields is useful as a great open space in the heart of London, while the call for an architectural revolution in the Strand is overwhelming. There is a rumour that the plan has been overlaid by the First Commissioner of Public Works, who never heartily supports what he does not originate. Mr. Cowper was wonderfully firm about the Kensington Gardens pony ride, —a horse ride it is not—wonderfully vacillating about space for the Royal Agricultural Exhibition of 1862. But in this country, where private enterprise does so much and so well in public works, and officialism so little, so slowly, and so ill, we shall never make much progress in metropolitan improvements until we permit private joint-stock companies to carry out the street improvements which the Board of Works or the Metropolitan Board have approved. Let us take Charing Cross, for instance—a magnificent area disfigured by mean buildings. The construction of the office of the Metropolitan Board has opened a charming vista into the Green Park. An obvious and profitable improvement would be to sweep away the Trafalgar Hotel, Farrance's shop, and all the paltry buildings of Cockspur Street as far as the insurance office, and replace them by an hotel, a row of shops and offices, suitable in magnitude and character to the situation and the importance of the traffic existing and about to be created by the conversion of Hungerford Market into a railway-station. The Metropolitan Board cannot and ought not to plunge into any such speculation; but it would be advantageous to the public, and injurious to no one, if there were obtained for such a scheme what the French call ex-propriating powers, to be handed over to any company provided with sufficient capital, and presenting a design which complied with certain before-settled conditions. The Westminster improvement scheme failed, because the promoters were men without capital who fell into the hands of thieves. Shops and offices in a main square or street are just as useful as railway-stations or courts of justice, and it is a mere play upon words to deny the powers essential for improvement, because the parties who find the money want to make a profit, instead of requiring power to tax ratepayers.

The commissioners on the Thames embankment appear to have devised a better, although less ambitious, plan than any of the three recommended by Sir Joseph Paxton's committee. They examined more than fifty designs, dismissed all the magnificent building and complicated dock schemes, and returned to the old lines of the oldest projectors of Thames embankments. Starting from Westminster Bridge at about as far from the shore as the end of the present floating-pier, they propose to abolish all the wharves up to the east end of the Temple Gardens, and to fill up the space with a solid embankment, which would be 220 feet in breadth from the river-wall of Richmond Terrace, 320 feet from the wharf at Hungerford, 120 feet from Somerset House, 220 feet from Temple Gardens, and about 4 feet above high-water mark. From the Temple, a viaduct, supported by piers of masonry, would rise to the level of Blackfriars Bridge—this part of the work being so arranged as to leave a breadth of 70 or 80 feet of water for the convenience of the City Gas-Works and adjacent wharves. On the embankment, a road 100 feet wide is to be constructed, to be diminished to 70 feet when it reaches the viaduct. On reaching Blackfriars Bridge, a new street—which commences with an enlargement of Lower Thames Street, and falls, by New Earl Street, into Cannon Street—is proposed to be carried on until it opens on the west side of the Mansion House—this arrangement being planned on the fact that Blackfriars Bridge is to be rebuilt lowered, and doubled in width. With respect to the large breadth of reclaimed land left after providing for the road, it is proposed that the opposite residential property, like Montagu House, Richmond Terrace, and the Temple Gardens, be laid out in ornamental gardens for the benefit of the occupiers, and that the remainder be kept open for the public, or sold for building purposes, as may be deemed most advisable. It is obvious that the reclaimed space at Hungerford would be of great value as a railway-station for the South-Western, and would afford access

to a frontage in Charing Cross by the purchase of Northumberland House—a hideous erection, without any historical claims to respect. But this is our suggestion—not the commissioners. In order to relieve the traffic of the Strand, the commissioners propose the following branch communications:—A new street from the embankment road, to come out exactly opposite the Horse Guards; an extension of Villiers Street; and a new street from Hungerford, communicating with an extension of Buckingham Street and York Buildings, and climbing up through the deserted Savoy to the middle of Wellington Street South, at a gradient of 1 in 40; and a crescent, uniting Surrey, Norfolk, and Howard Streets with the embankment. For the improvement of the navigation, the commissioners recommend that the existing shoals between Waterloo and Westminster Bridges should be removed, and that a uniform low-water channel, of 6 feet in depth at ordinary spring-tides, and 500 feet in width from the embankment-wall, be secured—thus equalizing the velocity of the stream. The cost of construction and compensation, including the new street to the Mansion House, the commissioners estimate at £1,500,000. And looking at how the commission is composed, this estimate may be relied on. The plan seems to meet all demands, destroys the mud banks of the Thames, facilitates the construction of the great sewer, adds to the beauty and health of London without infringing on the rights of the riverside mansions, or obstructing the views of the Templars, harmonizes with the new bridges at Hungerford and Blackfriars, and effectually provides a new and pleasant route to the Bank without raising up a street to compete with the shopkeepers on the old line. We observed some time since, before the corporation of London had made up their minds to pull down Blackfriars Bridge, that any embankment plan would be incomplete that was not worked out in harmony with the design for a new bridge. And certainly the embankment would do little to relieve the costly obstructions of Fleet Street and Cheapside, unless it tapped the City with a good street from Blackfriars to the Bank. The commissioners, according to the nature of such creations, conclude by endeavouring to perpetuate themselves, recommending that the works should be intrusted to a special commission. We have nothing to say against the Thames embankment commissioners; quite the reverse, but there really must be an end of this founding of commissions which, like that famous bird of the fire office, seem to enjoy perpetual life and youth, through a process of reincubation. The embankment of the Thames naturally falls either to the Government Board of Works, or to the Metropolitan Board. The examples of Chelsea and Westminster Bridges, do not inspire the public with any great confidence in Government constructive abilities: time never seems an object to a public officer or a commissioner. The Metropolitan Board was specially called into existence for the execution of a great work, the completion of which involves the embankment of the north bank of the Thames, or the suspension of the trade of the greatest metropolitan thoroughfare for two or three years. The magnitude of this main drainage scheme is only not appreciated because it is underground, and not seen. Had it been executed before the era of railway tunnels, it would have been considered one of the wonders of the world. As it is, when completed—and it is steadily approaching completion—it will be the greatest work that has ever been executed for sanitary purposes, and the greatest work of any kind that has ever been attempted within the precincts of a city. If the Metropolitan Board of Works is fit to be trusted to carry out the main-sewer canals of London, it can certainly be trusted to execute the much simpler and easier work of Thames embankment, sketched out by the very able and competent commission which has just reported. The Metropolitan Board of Works is new to its duties; and, being numerous, of course includes a few specimens of hobby rider, parish orators, and hair-splitting talkers, of the common council genus. But, so soon as the first great difficulty—the money difficulty—was overcome, it went to work in earnest. It is being gradually weeded of the obstructive and talking element; and a complete report of its proceedings would show a great deal of work done, and the foundation laid for much more, and all of a useful, if not of a brilliant above-ground character. As we prefer in this country to be governed by representative institutions, we must take the defects with the advantages, remembering that it takes a certain time to make any representative body work smoothly. The metropolis and the nation will gain nothing by placing more work in the hands of Mr. Cowper or Lord John Manners. The men of business in the Metropolitan Board have overpowered the mere talkers and crocheteers—its future existence depends on rapid and economical execution of the work intrusted—the official existence of Mr. Cowper depends on Lord Palmerston's life and parliamentary fortune—and what the board requires now is, time and fair play. The Thames embankment will be carried on in the face of day—not underground; and, no doubt, the engineer of the board will be able to obtain, if required, the aid and advice of some of the eminent members of the profession who so ably and generously assisted in preparing his admirable main drainage scheme. But, as the embankment traverses City property for so great a distance, it would only be right—and, certainly, for the advantage of the public—that the engineer of the corporation of London, Mr. Haywood, who so thoroughly understands the soil and its difficulties, as well as the river, should be associated with Mr. Bazalgette.

The new bridge at Blackfriars is closely associated with the plan of the Thames embankment. Seventeen gentlemen, out of a committee of forty-one (it might just as well have been four hundred), have, without consulting either the City architect or the City engineer, selected Mr. Page's plan out of about a dozen, sent in by the most eminent bridge engineers of the day; and the aldermen and common councilmen of London will shortly decide whether they will satisfy the selection of the committee. According to the description, Mr. Page's plan has great merits. It is to be constructed of iron arches on granite piers, after the manner of new Westminster Bridge. The arches will be three in number, the centre being 280 feet span, the other two, 220; but the inconvenient and dangerous pitch of the present bridge will not be retained, as the surface of the central arch will be 9 feet lower than the present one, and the approaches on each side, instead of being 1 in 24, will not be more than 1 in 40. The width is to be increased from 42 feet, as at present, to 76 feet—divided into two footpaths of 14 feet each, two tramways for heavy traffic of 17 feet each, and two roadways for lighter carriages and horsemen. The cost is estimated at £245,000, or about £3. 5s. per superficial foot. We are sorry to hear of colossal groups of statuary to crown the extremities of Doric columns supposed to unite the balustrades. The London climate is not suited for out-of-doors statuary, even if we could find a sculptor capable of executing anything decent on a gigantic scale. But, really, with a painful recollection of the two equestrian George IV.'s in their blankets at the Bank and in Trafalgar Square, the cocked hat and pigtail George III. in Cockspur Street, the fearfully comic caricature of the Duke of Wellington on the Constitution Hill Arch, we should be glad to be spared any more subjects for the well-deserved ridicule of intelligent foreigners. There is little doubt that Mr. Page's is an excellent design, well adapted for the purpose; although, without seeing the others, it would not be safe to be as enthusiastic as his friends in the newspapers. But, whatever design be adopted, it must be modified to meet the exigencies of the Thames embankment; and, it will be very much to be regretted, if an attempt be not made to harmonize it with the bridge of the new Dover Railway. This bridge, as at present planned, will be about 100 feet from the new Blackfriars Bridge. Surely it would be worth some sacrifice of dignity, if not money, to combine the two in one magnificent and harmonious high and low-level structure. Our engineers are great in bridges; our sculptors fail in colossal statues. We repeat, for the second time, this suggestion, feeling assured that if the City authorities decide to co-operate with the railway directors, engineering difficulties can be overcome with little difficulty, and probably without any sacrifice of money.

In the discussion which took place in the House of Commons, when the president of the Board of Works stated that it was the intention of the Government to introduce a bill for carrying out the report of the commissioners, and to intrust the work to the Metropolitan Board, reference was made to the necessity of rendering the undertaking complete by an embankment of the Surrey side. It has already been shown in the evidence before Sir Joseph Paxton's committee that, if Parliament will grant the necessary powers, there are railway companies prepared to carry out the Surrey side embankment at their own cost, and thus form a complete and direct communication between the railways which are about to cross the Thames near Hammersmith Bridge, and all the intermediate stations up to London Bridge. It may be some consolation to those who regret the long delay in the execution of the Thames embankment, that such a work would have been

most disadvantageous to the passenger trade of the river before the introduction of steam-boats. Already the embankment from Pimlico to Chelsea has so increased the rapidity of the current, that it becomes a very difficult task to row up that part of the river two hours after high water. The embankment has cut off the still water and eddies, of which the skilful waterman formerly took advantage; and, whenever the double embankment is completed, we must prepare to see an ebb current against which nothing less than the power of steam or a strong wind can contend.

On Wednesday last, the wharfingers west of the Temple, with some of the deodorizing speculators, and the authors of some rejected plans, had a little meeting, with Mr. Henry Hoare as chairman, to protest against the abolition of their coal wharves; to recommend the manufacture of sewerage manure, which experience has proved not to be saleable; and to condemn the low-level main sewer and pumping apparatus, which has been planned and approved by the most eminent engineering authorities of the day. In supporting these absurdities, the chairman and the well-arranged meeting seem to have been almost unanimous, and the dead season gave them a full report in the daily papers. It is a pity that a respectable banker should lend his name to such folly. The tone of parish morality, as regards the joint-stock companies which undertake works of public utility, is very low, and often almost dishonest. For instance, the Underground railway, as it is popularly called, has only been maintained and carried out under the most adverse circumstances by the tenacity of a few shareholders and an engineer. It was long a most unprofitable—almost a hopeless undertaking. Within the last few years, its importance has been generally acknowledged, and its prospects have brightened. Like other railways, it has had to make its way by force of money—buying every inch of ground at at least double its value—getting nothing for nothing. Yet we hear of an indignation deputation, from the inhabitants of Euston Road, to the St. Pancras vestry, because the railway company decline to make the parish a present of a great public improvement. The railway company, in the course of their works, were compelled to purchase, at the very highest price possible, a public house—the King's Head—"which, projecting into the road some twelve feet beyond the frontages of the other houses, destroys the line of the Euston Road, and makes it most inconvenient for pedestrians crossing and recrossing four busy roads," and pulled it down, in order to strike a railway arch. They are now about to rebuild it; and it is made a grievance that they decline to make the parish a present of the twelve feet of depth which the frontage extends into the main road. As it is, the railway company will enormously benefit the parish not only by introducing a rateable property, which will reduce the local taxes, but by a new mode of communication, accompanied by improved drainage of the whole district traversed. They have purchased earth at the price of gold, and are now expected to make a free gift to the parties who have never missed a chance of flaying them. Vestries seem to say to the authors of useful public works, "As you are going to do for the parish what the parish would never have done for itself, you must pay a fine for your audacious enterprise." Major Wilkinson recommended that, if possible, advantage should be taken of the 143rd clause in the Metropolis Local Management Act, to annex the twelve feet for the benefit of the parish. Others, more honest, proposed offering a reasonable compensation.

Frequent occasions for easy and economical public improvement are afforded by the construction of metropolitan railways and other works, and it should be the business of the local surveyors to report such opportunities in good time, so as to effect amicable and equitable arrangements, in which public companies will generally be found liberal. Tramways are about to be laid down along the Waterloo, Borough, Blackfriars, London, Westminster Bridge, and New Kent Roads, Newington Causeway, Stones End, and Blackman Street; but, as the little bit of Victoria Street tramway is not to be extended over Westminster Bridge, the benefit of these ways will be very much limited. The fact is that Mr. Train, by his recent conduct in a police-court case, has made himself so thoroughly and deservedly unpopular that no gentleman cares to be brought in contact with him. However silly a Member of Parliament may be, Englishmen will not permit him to be *blacked* after the New York Herald fashion.

The blessing of a hearty laugh in the House of Lords was afforded by a majority of one, in a division in favour of the clause of the Municipal Act Amendment Bill, giving precedence to the Mayor at meetings of borough magistrates—the one being Earl Russell! The numbers were 26 to 25. The annual accounts of the county treasurers of England and Wales, show that there was received for last year more than £1,200,000 for county and police-rates, varying in different counties from less than 2d. in the pound to more than 8d., assessed on upwards of 68 millions of property. In 1858, the assessment was a little more than 65 millions. Surely this large and important expenditure should be intrusted to responsible administrators. In every county now is to be seen some monument of magisterial folly, in the shape of a palatial lunatic asylum or gaol—the result of placing irresponsible power in the hands of gentlemen who do not even know how to manage their own affairs. If county expenditure were managed by the agents of noblemen and squires, and checked by the masters of those agents, the plans of men of business would be under the control of men of honour; as it is, county-rates fall into the hands of crochety busybodies, and every gaol and every lunatic asylum is either a costly failure, or a costly job for some one's benefit. Why not apply the Chandos clause to county-rates? The best men would still be in the county council, and the doting and the busybodies would be shelved; for the farmers, who pay the rates over which they have no control would, as voters, remain what they have always been—conservative supporters of the landowners.

The council of the Institution of Civil Engineers have issued a list of subjects for premiums for the session of 1861-2, prepared with unusual care and skill. Eleven subjects more or less refer to engineering works connected with the sea or rivers—as, for instance, "On the Improvement of River Navigation, Drainage, and Irrigation;" "On the Injurious Scour or Silting-up in Estuaries or Rivers, caused by Engineering Works;" "On the Effect of Sluicing in Removing and Preventing Deposits at the Entrances of Docks;" "On the Method of Constructing Foundations in Deep Water, and various Systems of Driving Piles;" "On Cranes, and other Machinery, set in Motion by Steam or Water-power;" "On the Selection of Sites for the Construction of Docks on Tidal Streams, and for Breakwaters, Harbours of Refuge, &c.;" "On Floating Landing Stages for Traffic;" "On the Construction of Lighthouses." Premiums of twenty-five guineas each are offered for papers on the five following subjects:—"On Reclaiming Land from Seas and Estuaries"—which will doubtless give us the benefit of the experience of the unfortunate Netherlands Company; "An Account of Existing Water-Works, showing the Methods of Supply, and the Distribution throughout the Streets of Towns;" "On the Results of the Use of Tubular Boilers, and of Steam at an increased Pressure for Maritime Engines;" "On the Form and Materials for Floating Batteries and Iron-plated Ships, and the Points requiring Attention in their Construction;" "On Railway Accidents, their Causes and Means of Prevention,—showing the bearing that Legislation has upon them." Among the other subjects suggested are—"Drainage and Sewerage of large Towns;" "On Steam Vessels of Light Draught for India;" "On Improvements in the Machinery for Producing Sugar from the Cane in the Plantations of the British Colonies, and a Comparison with Beetroot with regard to Quantity, Quality, and Economy of Manufacture."

A pamphlet entitled "High Speeds" a letter to the president of the Board of Trade by George Robert Stephenson, Esq., lately privately circulated amongst the profession and Members of Parliament, protests against fast trains as dangerous and unprofitable to shareholders, and not much patronized by the public. It is difficult to guess the object of this pamphlet, which is as remarkable for the easy style in which it is written as for the absence of engineering facts. It is not intended to act on the public or on shareholders, for it is not published. It is not addressed to the profession of the gentleman whose name is on the title-page, for it contains no professional arguments. It cannot be expected to produce any effect on the Government, for what English Government would raise a hornet's nest about its ears by attempting to legislate on such a subject? The letter looks most like a series of articles by a professional writer, which had been rejected by the only paper in which they could have produced any effect, reproduced with the endorsement of a Stephenson's name. There is something solid to be said against excessive speed on railways, but we should find it difficult to settle what is excessive speed. The movement, for *slowing* express trains to have a chance of success

must come not from the Government, but from the shareholders. We have not space this week for saying more about a very important subject, which cannot be settled, or even advanced towards settlement, by mere talk, without facts and figures, and a definite remedial proposition. Captain Halsted's (also privately-circulated) collection of lectures, delivered before the United Service Institution, is a mistake in the opposite direction. Full of enthusiasm, crammed with facts, stored with the results of experiments, Captain Halsted has buried his chances of being read under a cataract of words, in a style of vehement obscurity. He certainly knows ten times as much about the value of iron-cased ships—probably, a hundred times—as much as Mr. Scott Russell; but Mr. Russell knows how to tell what he knows, and all that he has heard, and Captain Halsted does not. Mr. Russell's pamphlet on the same subject all who run may read and understand. Captain Halsted has prepared a scrap-book of valuable original information for some Scott Russell to make a reputation on.

Circular to Gas Companies.

For the third time in three successive years the Royal Assent has been given, on the last day of the session of Parliament, to bills for Regulating Measures used in Sales of Gas, or for rectifying blunders committed in carrying the same into effect, or for amending their provisions. The 13th of August, 1859, witnessed this formality with respect to Lord Redesdale's original Act; the 28th of August, 1860, its suspension for fourteen months wherever it had been adopted, and its complete emasculation by rendering its adoption permissive instead of obligatory; while, on the 6th of August, 1861, an Act is passed whereby the powers which the justices of Middlesex and Surrey had refused to exercise, are transferred to the Metropolitan Board of Works, who are required to bring the Act of 1859 into operation in the metropolis within two months. At the meeting of the board, on Friday last, it was resolved to appoint, in the first instance, two inspectors for the northern portion of the metropolis, and one for the southern, at uniform salaries of £200 a year for each; but it is quite certain that such a staff will be totally inadequate for the purpose of carrying the Act into operation, and that much confusion and inconvenience will be the consequence of attempting it with such inefficient means. The Middlesex magistrates had proposed to appoint four inspectors to act within their jurisdiction, and, we believe, even that number will barely suffice for proving and stamping the new meters made within the district, to say nothing about meters now in use which may be tendered for examination. The southern section of the metropolis ought to have two inspectors, or Greenwich and Woolwich would be practically excluded from the Act, if they have to send their meters to an inspector in Southwark. The board, however, deserve credit for the prompt manner in which they have taken the matter up, and we trust that no parsimonious feeling will interfere with giving the measure a fair trial. The fees on new meters made in the metropolis cannot amount to less than £2000 a year, a sum more than sufficient to cover the expenses of a competent staff; but, even were it not so, the board have a public duty committed to them, and, if they desire to recruit their popularity, they have now an opportunity afforded them, by showing that they are competent to discharge such a duty efficiently.

One result of the Act just passed has been to prevent the monopoly which Mr. Taunton had proposed to create for himself as sole tester of gas-meters in the metropolis, and to drive him altogether from office. Whether he resigned or was dismissed, or resigned to avoid dismissal, has been variously stated; but, there is no doubt that he has ceased to hold the office of inspector under the Act in the City of London, and that Mr. Sporne, from Messrs. Parkinson's establishment, who was a competitor of Mr. Taunton's when he was originally elected, has been appointed in his stead, to the great satisfaction of the trade, with the majority of whom Mr. Taunton had rendered himself obnoxious by the partisan spirit in which he availed himself of his official position to advertise a certain class of meters, and to decry all others.

The question of public lighting has been again mooted in the metropolis, in consequence of the Chartered Company having raised the price of the 88 lamps now lighted by them in the parish of Shoreditch, to the full amount authorized by the Metropolis Gas Regulation Act. For some years past, all the public lamps of that parish were lighted by the Independent Company, who contracted to do so at the low price of £4 per lamp, including cleaning, lighting, and repairs. A small portion of the parish is in the district of the Chartered Company, and, on the termination of the former contract, it became the duty of that company, in compliance with the regulations of the Metropolis Gas Act, to light the lamps in their own district; and they accordingly tendered to do so, at the same price they charged in Clerkenwell. It may be remembered that, in the latter parish, the Imperial and the Chartered companies were induced, in consequence of the exorbitant increase in the assessments on their mains and pipes, to advance the price charged for lighting the public lamps—the former 20s. per lamp, and the latter, 22s. 6d.; and the same rate of charge—viz., £5. 9s. per lamp, including lighting, cleaning, &c., is now made by the Chartered Company for the 88 lamps included in their district in Shoreditch. The vestry, contrasting this charge with that of the Independent Company, for what professes to be the same quantity and quality of gas, feel themselves aggrieved; but, as the price charged is not greater than is authorized by the Act, they have no ground of complaint on that account, and they are endeavouring to make it appear that the quantity supplied is deficient, and that the illuminating power of the gas is not equal to the parliamentary standard. Recourse is, therefore, had to some experiments made by Mr. Hughes for the Clerkenwell vestry, and reported by him in April last, according to which, it would appear that the quantity of gas supplied by the Imperial Company to the street lamps was $4\frac{1}{2}$ feet per hour, instead of 5 feet, and that the illuminating power did not exceed 10 candles. Mr. Hughes's method of arriving at such results we have again and again disputed, and have shown that they are not to be relied on. To ascertain the quantity of gas consumed in the night, he abstracted several burners, and then measured, with an experimental meter, the quantity of gas that would pass through them at a given pressure, which pressure was estimated by other experiments. All such means of attempting to ascertain the quantity of gas consumed by a street lamp, as they depend on a variety of circumstances, are very liable to error, even when the experiments are made by the most skilful and unprejudiced manipulator; and we must strongly protest against receiving the results arrived at by Mr. Hughes as conclusive evidence. With respect to his experiments on the illuminating power of the gas, it may be observed that they were most probably made with his favourite bromine test, with the varying co-efficient, by which he has on other occasions arrived at most extraordinary results; and, we are less inclined to rely on their accuracy, since we know them to be directly at variance with reliable photometrical experiments, from which it appears that the gas of the Imperial Company at the King's Cross Station is considerably above the required standard.

The experiments of Mr. Hughes on the gas supplied by the Imperial Company to the public lights of Clerkenwell, have been assumed by the vestry of Shoreditch to apply to the gas supplied by the Chartered Company to the lamps lighted there in that parish. The vestry seem determined rather to have their streets darkened than pay the advanced price, for they have contracted with the Chartered Company for 4 feet of gas per hour per lamp instead of 5, and they have resolved to attach meters to 6 of the 88 lamps, to be assured they obtain the quantity contracted for. The hostile feeling of the vestry is manifested also by their desire to have the Chartered Company fined for breach of contract, should it be proved that the purity of the gas is not equal to the Parliamentary standard, or that the quantity supplied is deficient.

A dispute has also arisen between the local board, and the two gas companies at Reading, respecting the public lighting of that town, in which Mr. Hughes is again the stimulator of discontent. In the Reading case, however, he does not come prominently forward, but appears in the background as the prompter of those who are hostile to the gas companies. There is no monopoly at Reading, but active competition between the two companies who supply the town with gas, and the consequence is, that they are obliged to charge a higher price to private consumers than it is supplied in neighbouring towns. The consumers have the option of taking the gas from which company they please; but, owing to the additional cost of two sources of supply, they must pay for that privilege something like 1s. per 1000 feet more than might otherwise be required. Though the two companies are in competition for private custom, they agreed to send in a

combined tender for lighting the public lamps, at a reduction of about 8s. per lamp on the former price. This tender was considered unsatisfactory, and the board requested the companies to reconsider it; but they adhered to the terms proposed, and refused a conference on the subject. The matter was discussed at a recent special meeting of the board, at which the late mayor and the clerk, who stated that he had had five hours consultation with Mr. Hughes, expounded the art and mystery of gas-making, and, if their speeches be correctly reported, they made numerous assertions of which Mr. Hughes, the alleged authority, would be thoroughly ashamed. As specimens of some of the fallacies uttered, it was asserted that one of the principal gas companies in London paid a contractor only 1s. 3d. per 1000 feet for gas, including all expenses of labour, management, &c., and that they put an end to the contract because they thought they were paying too much; it was asserted also that in London the cost of lighting the street lamps is only 6s. per annum; that gas, of the illuminating power of 12 sperm candles, might be sold in Reading at 1s. 3d. per 1000 feet; and, that other towns "supplied themselves at 2s. per 1000, and handed over thousands a year to the diminution of the rates." Such is the information given at second-hand to the board of health at Reading, by the gentlemen whom Mr. Hughes had prompted for the occasion. The discussion ended with passing a resolution to advertise for tenders for lighting the public lamps, which may be considered as equivalent to an invitation for the formation of a new gas company, the existing companies having sent in their tenders. As the gas consumers of Reading already pay rather dearly for the choice of one out of two sources of supply, they will scarcely be inclined to extend the liberty of choice with the almost necessary consequence of a further increase of price.

We are continually witnessing the revival, in different forms, of exploded schemes, which, after having for a short time attracted attention, and raised the expectations of speculators, sink into oblivion, to be again resuscitated, after a term of repose, and reproduced once more as new. Naphthalized gas is one of these ever-recurring illusions, which, like a revolving light, after shining brightly for a short interval, becomes dim, and is extinguished, but again flashes out with renewed splendour, and in due time again disappears. After an obscurity of rather unusual duration, naphthalized gas has once more reappeared, and it now presents itself under the sanction of the "United Kingdom *Carburating* Gas Company (Limited)," with a nominal capital of £60,000, and guided by four directors, amongst whom figures Mr. E. C. Shepard, of electric-gas notoriety. The prospectus of the company represents that the invention (?) increases the brilliancy of the gas, and economises its consumption by about one-half, so that there would be a saving on each street lamp per year of £2. 3s. 6d. The directors of the company have succeeded in getting a paragraph inserted in the *Times*, describing some experiments made with the "patent *carburator*" in Moorgate Street, under the authority of the Commissioners of Sewers, from which it would seem that 3 feet of ordinary coal-gas carburetted with naphtha gave a light equal to 5 feet of the same gas not carburetted. The authority of Dr. Letheby is quoted in the prospectus as favourable to the process, and the results of several of his experiments are recorded, showing that, with good naphtha applied in proper quantity, the illuminating power of the gas may be nearly doubled. These experiments, however, point to the difficulty of maintaining an equal intensity in the light, and to other practical inconveniences that would attend the process of carburetting, assuming it to be attended with the effect of economizing the combustion of gas to the degree represented. The plan of naphthalizing gas has, indeed, been tried again and again; but, however great its seeming advantages have appeared on its introduction, experience has proved that those advantages disappear on practical application, and there is nothing in the patented method of applying it to encourage the hope of better success at the present time.

We are afraid of wearying our readers by noticing Mr. Flintoff's doings in Scotland, for the fallacious statements and senseless abuse of gas companies which form the staple of his lectures are too gross to be worth replying to; nevertheless, it must be admitted that they have produced considerable disturbance among the gas consumers, and have given much annoyance to the gas companies in the north; and he has thus acquired an importance much greater than he deserves. The manager of the Selkirk Gas-Works has thought it worth his while to reply to the fallacies of Mr. Flintoff respecting the cost of gas in that town, and has completely refuted all Mr. Flintoff's assertions, showing that his estimates of the cost of construction, of the price of coal, and of the yield of gas, are altogether erroneous, and exposing the groundless pretensions of the ex-bookseller to be an eminent gas engineer. Such exposures, however, have little effect on Mr. Flintoff, who possesses such strength of confidence as to be impervious to the assaults of truth. He has, indeed, in the face of those exposures, offered, in the event of a new company being started at Selkirk, to procure a contractor who would take the works on lease, and guarantee the supply of gas at 4s. 6d. per 1000 feet, and to pay a dividend to the shareholders of 5 per cent. for the first year, increasing to 7½ per cent. in the third. Nothing is said about the illuminating power of the gas to be supplied; and, even assuming that Mr. Flintoff fulfilled the engagement—and that is a great assumption—the gas consumers of Selkirk, who are now supplied with 30-candle gas at 7s. 6d. per 1000 feet, might find they gained a loss if they paid 4s. 6d. for gas that gave less than half the amount of light. How far the shareholders might benefit by the arrangement, the present bankrupt state of Mr. Flintoff's gas consumers company at Whitehaven may be adduced as a warning illustration.

We have previously noticed, in connexion with the cheap gas movement in the north, a series of articles published in an Edinburgh paper "On the gas supply of Scotland," of which we gave Mr. Flintoff the credit of being the writer. If there were any doubt of the author, it would be removed by the twelfth article of the series, in which the spirit of the pamphleteer of Fleet Street appears too palpably to be mistaken, and even some of the expressions are almost identical with those in a notorious poem, that obtained for its writer the distinction of a flagellation. As a specimen of the tone and style of these articles, we quote the following passage:—"It is because gas shares are in the hands of a limited number of speculators, with a large amount of money at stake, which only cost them half their market value, together with the fact that gas managers know little of their business, and do little in this world beyond eating, drinking, and sleeping away their time, that high prices for gas continue to be upheld." It seems strange that, in an enlightened city like Edinburgh, any paper should be found to insert such trash; yet, a great portion of the articles professing to give information respecting the manufacture of coal-gas is of a similar character. In a more recent number of the same journal, there is a leading article on cheap gas, apparently proceeding from the same pen, in which allusion is made to our remarks on the condition of the consumers company at Whitehaven, and to the fact that gas is sold there by the old company—who pay a dividend of 2 per cent.—at 2s. per 1000 feet; and, because gas can be sold at Whitehaven at that price, it is inferred that it might be sold elsewhere at the same rate. The writer omits to state that, owing to the peculiarly favourable situation of Whitehaven, gas can be manufactured there cheaper than at any other town in the kingdom; and he entirely overlooks the main fact, which has a bearing on the value of Mr. Flintoff's services as a gas engineer, that the consumers company established at Whitehaven, by his advice and under his direction, though charging 6d. per 1000 feet for gas more than the old company, pay no dividend, and are considerably in debt. The reasonable inference to be drawn from the Whitehaven case—to which Mr. Flintoff is fond of alluding—is, that if his advice and direction have produced such lamentable results in a place most favourably situated for the manufacture of gas, they will not be more profitable in other towns that do not possess equal advantages.

Press of matter has compelled us to delay the publication of the report of certain proceedings in the Court of Queen's Bench, in June last, upon a motion to commit one of the parties convicted with the Longton Gas Company of creating a nuisance by digging trenches for laying down service-pipes from the gas-mains in the town of Longton, in consequence of some breach of the undertaking which was contained in a rule of court after judgment upon the indictment for a nuisance. The exact nature of the breach complained of did not transpire, and the defendants denied that any breach whatever had been committed; but, in the end, it was agreed that the motion for the committal should stand over, upon the understanding that the matter would not be mentioned again, if the company really abided by their undertaking. We hear that, finding it impossible to carry on their operations without statutory powers, it is the intention of this company to apply for an Act in the next session of Parliament.

Register of New Patents.

80.—William Henry Moran, of Cologne, for "*Improvements in gas-meters.*" Patent dated Jan. 11, 1861.

The drawings attached to the specification exhibit an ordinary meter with the improvements applied thereto. The water for the supply of the meter is introduced into a chamber or reservoir, from whence it is raised into a separate compartment or vessel, at each revolution of the axis of the drum, and by such means an uniform level is kept up in the measuring-compartment of the meter. The vessel is constructed in such a manner that the water therein may overflow, when the water-level would otherwise rise higher than the proper level in the measuring-chamber. This may be effected by an overflow-pipe, or in any other convenient manner.

In the drawings, the sides of this chamber are at the height of the proper water-level, so that any addition will overflow into the reservoir. The compartment or vessel communicates with the measuring-chamber by the passage through which the axis of the measuring-drum passes, so that the water-level in both will be constantly the same.

On the axis of the drum a disc, or other suitably-formed instrument, is fixed, having pins or projections, which, as the drum rotates, act in succession on and then depress the bent tail or projection of a lever-scoop, which is heavier on one side of its axis than on the other, so that, when released, it falls to its lowest position, and its other end comes against and is stopped by a piece of cork or other elastic material. The stem of this lever-scoop is tubular, so that, when the scoop end thereof is raised above its axis, which is on the edge of the vessel or compartment, the water will descend from the scoop through its stem into such vessel, so as constantly to maintain the same level of water in it and in the measuring-compartment.

The index-apparatus is actuated in the ordinary manner, and is contained in a chamber formed above the reservoir, which is separated therefrom, so that the apparatus is not liable to be rusted.

In addition to the ordinary inlet-valve and float, there is a second valve, the two floats being kept separate and independent of each other. The second float is in a chamber, partitioned or cased off from the reservoir in which the float is placed. The space or chamber in which the second float is placed is open to the water in the measuring-compartment, the object being that, should the level of the water in the measuring-compartment sink a short distance, the valve should close down on its seat and stop the further passage of gas in that direction.

The stem of this valve is bent, so as to come under its float, in order that it may rise vertically into the valve-chest, into which the gas is first supplied.

On the disc, there are two or more studs or projections, the object being to insure that sufficient water shall be constantly raised by the scoop to keep up a constant and uniform water-level in the measuring-compartment of the meter, and to accomplish which, the water raised by the scoop into the vessel or compartment from the reservoir, will require to be a little in excess.

From the above description, it will be readily understood that, so long as there is water in the reservoir of the meter, into which the scoop descends, a supply will be raised from thence, and will run from the scoop into the vessel or compartment, and from thence into the measuring-compartment of the meter; but, as the water-level in the reservoir falls, the float and valve will descend, until the valve is at last closed, so as to prevent the further in-coming of gas to the meter—the water-level in the measuring-compartment of the meter being maintained so long as the scoop raises water into the vessel from the reservoir; and, should the water-level in the measuring-compartment from any cause descend, the second float and valve will descend and close the passage, and, consequently, the flow of gas into the meter.

The patentee makes no claim to any of the mechanical parts of these improvements separately; but what he claims is, the combined arrangement of apparatus herein described, for keeping up a constant level in a gas-meter.

82.—Alphonse René Le Mire Normandy, of Odin Lodge, King's Road, Clapham Park, Surrey, for "*Improvements in connecting gas and other pipes.*" Patent dated Jan. 11, 1861.

This invention has for its object improvements in connecting gas and other pipes. The pipes, to which the improved joint is applied, are made plain from end to end, or at any rate at each edge of either end, that is to say, without sockets, flanges, or projections, and a disc or plate is slipped over each of them, which disc is provided either with an annular recess or with a protruding rim, according as one or other of the methods herein described for making the joint is employed. These discs or plates have in their centre a hole rather larger than the external diameter of the said plates, which are thus passed through the holes of the said discs or plates. A washer or ring of vulcanized indiarubber, or other suitable packing material, is then slid on or pressed tightly over the ends of the pipes, a short way from the point where the said pipes are to meet, or to come opposite to each other, and afterwards a short length of tube, collar, muff, or short cylinder, either plain or else provided with a recess, but, in either case, made to fit loosely the exterior diameter of the pipes, is placed between the two packings or filling-pieces. The ends of the pipes to be connected together being just opposite to each other, the short exterior tube, or cylinder, is slid over so as to cover the ends of the said tube, and the plates or discs are then drawn towards each other by screw-bolts, so that the washers or packings may be compressed between the plates and the ends of the short external tube, so as to form a tight joint.

The claim is for the methods of connecting pipes by means of a loose collar or muff, and of flanges between which a suitable packing or ring of vulcanized caoutchouc is pressed by the means of bolts and nuts round pipes to be connected, so as to form a tight joint as herein described.

95.—Elijah Freeman Prentiss, of Birkenhead, in the co. of Chester, manufacturing chemist, for "*Improved apparatus for regulating the flow of gas, part of which is applicable to the valves of steam-engines.*" A communication. Provisional protection only obtained. Dated Jan. 12, 1861.

This invention of improved apparatus for regulating the flow of gas, has for its object the equalization of the pressure of gas as it flows from the gasholder to the burners, and will be found more particularly applicable when employed to regulate the flow of gas under heavy pressure, such as when portable gas is used for illuminating purposes.

The gas, under pressure, is conducted from the gasholder by means of a pipe provided with a peculiarly-formed cock or valve to a chamber from whence, when the pressure is diminished to the proper amount, the gas passes through another aperture or pipe to the burners.

The cock or valve which regulates the admission of the gas to the chamber is constructed on the rotary principle. It is made of a conical form, and, of course, is fitted to a seat of corresponding form. A passage is made along the axis of the cock to the centre, where it meets with a transverse passage, which conducts the gas in opposite directions to a chamber made outside the cock in the seat. Another transverse passage is made in the cock, parallel to the former, and communicates with an exit passage also in line with the axis of the cock, and with the entrance passage above-mentioned. By these means, the gas is made to press on both sides of the cock alike, and, consequently, a balance of pressure on the cock is obtained. The seat of the cock is made moveable thereon, and is connected by a lever or arm, and a rod with a spring-box or elastic medium, which is adjusted to a given pressure. Upon gas being admitted through the regulating cock or valve into the chamber, and pressure being exerted on the elastic or yielding sides of the spring-box, the latter will be collapsed thereby, and will, consequently, tend to close either wholly or partly the entrance-valve or cock, until the pressure is reduced, when the elasticity of the spring-box will again open the valve and allow the gas to flow in. The interior of the spring-box communicates with the external atmosphere by means of a tube, which passes through a stuffing-box, to prevent the gas from escaping from the chamber. An adjusting screw is adapted to the tube of the spring-box, so that the apparatus may be regulated to allow the gas to pass through at a given pressure.

It is preferred to construct the spring-box, or elastic medium above-described, in the following manner:—The discs of which the box is made are constructed of thin sheet-brass, which is wound up in a convolute coil, and covered over with some elastic or tight substance. The discs are slightly dished or concaved, and are soldered together at their edges, so as to form a shallow chamber, which communicates as above-mentioned with the external atmosphere.

In using the above apparatus, the gas is admitted thereto through a valve, which is placed on the supply-pipe between the gasholder and the regulator.

110.—Joseph Willcock, of 89, Chancery Lane, London, patent agent, for "*Improvements in gas-regulators.*" A communication. Provisional protection only obtained. Dated Jan. 15.

These improvements apply to the ordinary regulators, wherein the inlet of gas admitted at varying pressures is caused to flow from the said regulators at a more regular and less varying pressure, this result being obtained by the action of the outlet-gas on a bell suspended freely in a water-reservoir, and to which is appended the regulating cone in the centre of the inlet-orifice; which orifice is diminished when the outlet-pressure augments by the rising of the bell and consequently the cone, the reverse taking place when the pressure diminishes.

These improvements consist in substituting for the ordinary cone a new description of valve or valves, so arranged that the varying pressure of the inlet-gas can have no injurious effect on their working, and it is caused to act latterly in contact with them, and not on their under surfaces, whereby they are maintained in a state of equilibrium, and the pressure of the outlet-gas is more regular and uniform.

One description of valve which is made use of for this purpose, consists of a short hollow cylinder, which rises and falls between two stationary rings or flanges, forming part of the inlet-chamber, the regulation in the pressure of the gas being effected by its passage between the top of the said cylindrical valve and the upper ring of the inlet-chamber, and it afterwards passes through an outlet-chamber to an outlet-pipe either by flowing above the valve or through it.

The second description of valve which is made use of, consists in a longer hollow cylinder open throughout, the upper face of which regulates the pressure of the outlet-gas by its action against a stationary ring forming part of the inlet-chamber, whilst its lower extremity is sealed in water, or other appropriate liquid, the outlet-gas having constant access to the interior of the cylinder by the top opening so long as the regulator is working.

221.—Herbert William Hart, of 3, Rue Bergère, Paris, gas-engineer, for "*Improvements in gas-burners.*" Provisional protection only obtained. Dated Jan. 28, 1861.

This invention has for its object improvements in gas-burners, and the improvements more especially relate to that description of burners called argand gas-burners. In constructing an argand gas-burner, below the point of the burner at which the gas is ignited, an annular chamber is formed, in which felt or other material permeable by gas is placed, so as entirely to intercept the gas in its passage from the main to the point of ignition, and cause it to permeate the material in the chamber; and, in order that there shall be no obstruction to the gas after it has permeated the material in the chamber, the gas, in place of passing through a number of small holes to be burned, as in ordinary argand burners, passes through an annular orifice, and, in order to obtain a more uniform shape of flame, there is placed in the centre of the flame a circular piece of metal, or other material, by preference a semicircular cup, open at the top. This cup is mounted on a rod, so that it may be either raised or lowered. The glass chimney which surrounds the burner is made with a circular swell upon it, where it surrounds the metal cup, and the upper part of the glass globe, which surrounds the chimney, is made moveable, to allow of the swell of the chimney passing down through it. In order to improve the combustion of the gas, there is applied to the top of the chimney a piece of metal, or other material, which rests on the top of the chimney. This piece is bent downwards, so as to descend into the chimney, and is shaped so as gradually to contract the opening at its top. On the top of this piece is an ornamental bell-mouth cap, to which a reflector or shade may be fixed or removed at pleasure. In order to prevent the current of air to the

burner striking the flame at the point of the burner at which the gas is ignited, there is applied around the burner a short chimney of glass or other material. This chimney is of a slightly larger diameter than the burner, and its top projects a short distance above the point of the burner at which the gas is ignited. The exterior of this glass chimney is a short distance from the interior of the large chimney, so that air can pass between them to the flame; and, at the lower part of the burner, at which point air passes both to the interior and exterior of the flame, there is applied a cup of glass or other material open at the top, a small space being left between the top of the cup and the glass globe for the discharge of air. This cup is for the purpose of protecting the burner from currents of air.

The improvements above described as applied to an argand burner, combined with a chamber containing a material permeable by gas, can also be applied to a greater or less extent to other burners, but it is preferred to employ them with an argand burner, combined with a chamber containing a material permeable by gas, as above described.

APPLICATIONS FOR LETTERS PATENT.

1909.—Benjamin Browne, of 52, King William Street, London, patent agent and civil engineer, for "*An improved self-acting tap or apparatus specially adapted for lighting cigars.*" A communication. Aug. 1, 1861.

1912.—Henry Shaw, of 40, Lower Ormond Quay, Dublin, printer, for "*Improvements in wet gas-meters.*" August 1, 1861.

1924.—George Bish, of High Street, Stratford, Essex, engineer, and James Dredge, of 11, Adam Street, Adelphi, Middlesex, civil engineer, for "*Improvements in forming bends, and other forms or parts of non-metallic pipes, and in machinery or apparatus employed for such purposes, part of which improvements are applicable also to the formation of bends or curves in some kinds of metallic pipes.*" Aug. 3, 1861.

1927.—George Fowler Jones, architect, York, and James Jones, architectural carver, York, for "*Improvements in protecting and arranging water-pipes, and in mechanical contrivances for withdrawing the water from the same, and preventing their being injured by frost.*" Aug. 3, 1861.

1939.—Hermann Christian Meyer, of Hoxton, Middlesex, engineer, for "*Improvements in slide-valves to regulate or stop the flow of water, steam, or other fluid.*" Aug. 5, 1861.

GRANTS OF PROVISIONAL PROTECTION.

880.—Andrew Lamb, of Southampton, Hants, engineer, for "*Improvements in condensers.*" April 10, 1861.

946.—Henry Alexander Frederick Duckham, of Clerkenwell Green, Middlesex, gas-regulator manufacturer, for "*Improvements in gas-meters and regulators, and in compounding materials to be used as a coating for, or in the composition of, substances subject to the action of gas.*" April 17, 1861.

1666.—William Clark, of 53, Chancery Lane, Middlesex, engineer and patent agent, for "*Improvements in the distillation of solid and liquid combustible matters.*" A communication. June 29, 1861.

1803.—James Trigwell, of Terminus Street, Brighton, engineer, for "*Improvements in slide-valves.*" July 17, 1861.

NOTICES TO PROCEED.

633.—Charles Gammon, of Cloak Lane, London, gentleman, for "*Improvements in the mode of forming ventilators.*" March 14, 1861.

927.—Frederick Gye, of Wandsworth Road, Surrey, for "*Improvements in obtaining light, and in the apparatus employed therein.*" April 15, 1861.

1650.—Thomas Swinnerton, of Dudley Port, Tipton, Stafford, blast-furnace manager, for "*A new or improved manufacture of coal-gas by the surplus or waste heat of the blast-ovens and puddling-furnaces used in the manufacture of iron.*" June 28, 1861.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

696.—François Jules Emile Oosterlinck, "*An improved valve or plug for the passage of water or other fluids.*" April 1, 1858.

833.—Eugene François Sans, "*Apparatus serving to measure, upon a large scale, the smallest pressions of any fluid matters.*" April 17, 1858.

836.—François Charles Gilbert, "*A disinfecting composition to purify water-closets, and all insalubrious places.*" April 17, 1858.

874.—James Copcutt, "*Improvements in the manufacture of gas, and in the apparatus employed therein.*" April 21, 1858.

930.—James Henry Bennett, "*An improved arrangement of safety-valves for steam, gas, or any aireform or liquid body.*" April 27, 1858.

973.—Andrew Smith, "*Improvements in valves.*" April 30, 1858.

995.—William Ross, "*Improvements in taps or valves.*" May 5, 1858.

1099.—Charles Weightman Harrison, "*Improvements in obtaining light by electricity.*" May 17, 1858.

1126.—James Copcutt, "*An improvement in preparing materials employed to obtain light when using oxygen and hydrogen gases.*" May 20, 1858.

1133.—John Adamson, "*Improvements in the manufacture of parts of gas-meters.*" May 21, 1858.

1145.—Frederick George Underhay and Josiah Latimer Clark, "*Improvements in cocks or taps, and in apparatus for flushing.*" May 22, 1858.

1195.—Vincent Louis Vodoz, "*An improvement on the chimneys and glasses of gas and other lamps.*" May 27, 1858.

1248.—Thomas Scholefield, "*Improvement in gas-meters.*" June 3, 1858.

1251.—John Mitchell, "*Improvements in purifying paraffine.*" June 3, 1858.

1344.—George Neall, "*Certain improvements in gas-stoves for warming, cooking, and other purposes, as also in the saucepans, kettles, or other utensils to be used with the same.*" June 14, 1858.

1418.—William Clibran and Joseph Clibran, "*Improvements in apparatus or arrangements for distributing, governing the pressure of, and lighting gas.*" June 23, 1858.

1460.—Benjamin Young and Peter Brown, "*An improved method of collecting and disposing of the sewerage of towns or cities.*" June 28, 1858.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

1019.—Richard Waller, "*Improvements in engines, and apparatus, and means of obtaining motive power from liquids, vapours, gases, or air, parts of which invention may be applied to ordinary steam or other engines.*" May 6, 1854.

1051.—Warren de la Rue, "*Improvements in distillation.*" May 11, 1854.

1185.—Henry Kraut, "*Certain apparatus applicable to cocks, taps, and valves.*" May 29, 1854.

1196.—Henry Doulton, "*An improvement in the manufacture of junctions for sewers and drains.*" May 30, 1854.

Parliamentary Intelligence.

HOUSE OF LORDS.

July 30, 1861.

The Metropolis Gas Act Amendment Bill was ordered to be read a second time.

August 1.

The following Bills received the Royal assent:—The Victoria Docks Gas, the Birmingham Improvement, and the Stockport District Water Bills.

The Metropolis Gas Act Amendment Bill was read a second time, and committed.

August 2.

The Metropolis Gas Act Amendment Bill was reported, without amendment, and ordered to be read a third time.

August 5.

The Metropolis Gas Act Amendment Bill was read a third time, and passed.

August 6.

The Metropolis Gas Act Amendment Bill received the Royal assent.

HOUSE OF COMMONS.

August 6, 1861.

A petition was presented against the Parochial Assessments Bill.

HOUSE OF LORDS.

Tuesday, July 2.

(*Before Lord* Llanover (*Chairman*), *Lord* Churchill, *the Earl of* Sheffield, *Lord* Raglan, *and Lord* Aveland.)

DUBLIN CORPORATION BILL.

Mr. Calvert, Q.C., Mr. Barry, Q.C., the Honourable Robert Bourke, and Mr. Torrens McCullagh, appeared for the promoters; Mr. F. P. O'Malley, Q.C., and Mr. G. O. Malley, for the citizens of Dublin; Mr. Huddlestone, for the New Town Mount-Kennedy district; and Mr. Tindal Atkinson, for the Rathmines district.

Mr. Calvert applied that a message be sent to the House of Commons for the report of the royal commissioner appointed to inquire into the best means of obtaining a supply of water for the city of Dublin.

The application was assented to.

Mr. Calvert then proceeded to state the objects of the bill before their lordships. The promoters sought to obtain a supply of water for the city of Dublin, and a voluntary supply for the suburbs, as also to remedy the present imperfect rates. The promoters were actuated by no selfish motives; and this case, having received the unanimous support of the committee of the House of Commons, he trusted it would also obtain the assent of their lordships. Since the reign of Henry II., the city of Dublin had the right to supply itself under its old charter. The previous Acts contemplated the supply of the suburbs; but there was a deficiency in every one of these Acts, which prevented those resident from making use of the advantages under them. Indeed, there was no power to raise a rate in the suburbs under these Acts. Having detailed the constitution of the corporation, and the duties assigned to No. 2 water committee, the learned counsel proceeded to state the population of the city at 286,000, and of the adjoining districts as far as Bray, at 73,000. The intention was to supply this entire district of 360,000 inhabitants with a wholesome abundance of water. The supply hitherto had been obtained from the Liffey and the Dodder. Afterwards, from the years 1805 and 1808, and up to 1837, a debt had been accumulated which had reached £72,000, and for which the new corporation was liable. Since 1851, steps had been taken to reduce this debt, and to introduce various improvements. Having entered into details of the controversy with respect to bills Nos. 1 and 2 of last year, and the efforts made by Sir Edward Grogan and Mr. Vance, the members for the city of Dublin, to put a stop to them, and the appointment of a royal commissioner, Mr. Hawkshaw, to investigate the whole subject, he proceeded to show the failure of those attempts, and the foundation of the present bill thereon. The steps taken by the city members were adopted by the town council of Dublin, on the understanding that the bill should be ready for the present session. In this adoption of the scheme, it was worthy of their lordships attention that the words "the city and its suburbs" were introduced into the resolution of the town council, and that

the corporation all through constantly aimed at a magnificent scheme of providing for the outskirts as well as for the city itself.

The CHAIRMAN said there was no mention of the word "suburbs" in the letter signed by the Lord Mayor.

Mr. CALVERT admitted that his lordship was right, but the word was in the resolution of the town council.

The CHAIRMAN: Yes; but the documents afterwards do not support that.

Mr. CALVERT said the corporation thought the word "city" included the suburbs. The matter was not important, only as some of the opposition laid stress on it, he thought it right to call their lordships attention to it.

The CHAIRMAN: As you laid stress on it yourself, I thought it right to draw your attention to it. Powers are taken in the bill to supply the suburbs.

Mr. CALVERT: Yes, my lord; and you will admit the bill would have been perfect without such a provision. The learned counsel then proceeded to point out the disadvantages of a low level, as at present furnished by the canals, and to the hardness of the water now obtained as compared with the Vartry water. Mr. Bateman had stated the canal-water at 26 degrees of hardness; but in this he was incorrect. At any rate, the Vartry water had the decided advantage in point of softness. He next referred to Mr. Hawkshaw's report. The spongillæ, as existing in the present canal supply, which supported maggots that were capable of spinning threads after the manner of spiders, were fully pointed out in the evidence before the commissioner. The evidence to be laid before their lordships would fully corroborate the filth and inadequacy of the present supply. The attempts to remedy this mischief, had been continued for the last ten years. Mr. Hawksley, under whose auspices these operations had been conducted, was introduced to the corporation by the Board of Health in London, a body with which the corporation had no connexion. The plans submitted to Mr. Hawksley in 1855, when he came to Dublin, were the result of advertisement, inviting every one who knew any plan to bring it forward. Eleven plans followed, and amongst them the Vartry scheme, which was designed by a Mr. Hassard, at present in the employ of Mr. Hemans, the engineer to the Midland Great Western Railway. Considerable delay was caused by the illness and death of Mr. Sweetman, the chairman of the water-works committee of the town council, and by the absence of Mr. Hawksley on the continent. In 1858, when the matter was taken up again, Mr. Hawksley found his difficulties increased by religious and political prejudices, and by the fact that many large shareholders of the canals were members of the corporation. It would have been wrong for the corporation to consult the interests of the canals in a matter in which the entire of Dublin was concerned, and the present opposition, in his opinion, was but the final issue of that struggle. But Mr. Hawksley tried to secure a supply from the canal companies at a high-level pressure. A good deal of correspondence arose between the corporation and the canal companies, until the month of March, 1859, when the negotiations were broken off. Mr. Sweetman then attempted to obtain a supply from the Grand Canal and the Dodder, but this was dropped on the ground of expense, as also on account of Mr. La Touche, on the part of the canal company, declining to guarantee a fixed and preferential supply from the eleventh lock. When this plan failed, a committee of three was appointed by the corporation to negotiate with the canal company, but these attempts resulted in disappointments. Indeed, the canal companies were quite justified in declining any steps which would place them in a false position towards the public, if they found themselves unable to fulfil their engagement. The Coyford scheme was then tried, and abandoned before the bill to carry it out reached a second reading in the Commons. The corporation then adopted bill No. 2 as the result of the negotiations with the Midland Company; but, before standing orders, the promoters were surprised to find themselves opposed by some of the very parties who joined them in originating the measure. The corporation having been subjected to these annoying delays, and finding that the canals could not be depended on, as the evidence of Mr. La Touche before the royal commissioner admitted that, as the canal companies would not be properly paid for their guaranteed supply, he did not see how the companies would furnish it, and, indeed, that a guaranteed supply was not necessary, set about other plans.

The CHAIRMAN: Perhaps, it would be better to simplify the matter. The supply of a city like Dublin with water should be the primary consideration of the parties who propose to furnish it, and there is no necessity to pursue evidence where principle is concerned.

Mr. CALVERT: That was the very point, my lord, I was aiming at. I need only now enter upon the various plans submitted to the corporation. [The learned counsel proceeded to point out in detail the respective demerits of Lough Owel, the Dodder, the Dargle, the Liffey, the Kippure, Poulaphuca, Morristown, and Coyford, as sources of supply, all of which had been described in the commissioners report, and then enlarged on the advantages of the Vartry, especially as its waters could be brought along the coast, the inhabitants of the towns residing upon which would be delighted to pay a large sum, if a supply of wholesome water were secured to them.]

The CHAIRMAN here intimated a wish to be furnished with the Acts under which Dublin was at present supplied, to enable the committee to judge what population was intended to be accommodated, and what number of gallons was secured to each. The chairman gave the necessary order for this purpose.

Mr. CALVERT, having referred at some length to the desirability of the Vartry, and the favourable conclusions respecting it to which the royal commissioner had arrived, expressed a hope that this hitherto protracted struggle would now be brought to a close. Private means had been subscribed, in order to carry on the contest, which had lasted nineteen days in the House of Commons, and which would now, very probably, occupy several more; but it was sincerely to be hoped that the bill would be passed in the present session, and that the inhabitants of Dublin would no longer be placed at the mercy of canal companies, who could only afford them a filthy and most inadequate supply. The committee should recollect that the supply from the canals would be shortly cut off, owing to the expiration of the existing Acts. No slight part of the present inquiry was rendered necessary by the present imperfect rating. He would give an instance of it. While No. 34, Merrion Square, valued at £167, was rated at £1. 10s. a year, No. 18, Moss Street, valued at £10, was also rated at £1. 10s.

The CHAIRMAN: And this is not an arbitrary assessment of the corporation, but founded on the preceding Acts?

Mr. CALVERT: Yes, my lord. The bill now before the committee proposed to supply 400,000 inhabitants. The drainage area was 22 square miles, from which they would obtain a supply of 16 or 17 million gallons daily. In addition to this, 1 million gallons would be obtained from the Dodder. Thus, 25 gallons a head daily would be given to 400,000 people. The great reservoir would cover 409 acres. The depth of the embankment would be 60 feet, and the average depth of it about 20. The service-reservoir would be 270 feet above the sea. The supply would meet the wants of the continuous population dwelling along the line from Kingstown to Dublin. The entire expense would be £300,000, made up of £216,000 for works, a large sum for land, compensation, and a considerable sum to cover extras. This estimate had been tendered for. The revenue to meet this would be £28,900, obtained from the Act at an expenditure of £24,400, and £16,300 from the suburbs on an expenditure of £5250. Thus, while the annual profit from the city would be £4500, that from the suburbs would be £11,000. He need not enlarge on the advantages and profit to be derived to the city from the suburbs being supplied: indeed, he need not dwell on it. If a fire or a fever broke out in the suburbs, the evil effects would reach to the city itself. The same plan was adopted by Liverpool and Manchester. He would detain their lordships with some proofs of the popularity of the present scheme. At a banquet given by the Lord Mayor of Dublin, in February last, at which the Lord-Lieutenant and the city Members were present, his excellency urged the necessity of an improved supply of water. [Mr. Calvert read extracts from the speeches of Lord Carlisle, Sir Edward Grogan, and Mr. Vance, to show the unanimous feeling of the public in favour of the Vartry scheme.] This was at the very time when the bill for the Vartry was passing through the House of Commons; and Sir Edward Grogan, in his evidence before the House of Commons, admitted that, if the supply was not to be got from the Vartry, he knew not where it could be obtained. The opponents of the Vartry had acted most unfairly. They had never let out their plans until the last moment. The canal company subscribed to the citizens fund, the object of which was to uphold the Ballysmuttan scheme, while they themselves appeared before the committee by counsel in support of plans which were altogether different. He did not intend to dictate to their lordships; but he would urge it respectfully on the committee that they should insist on the present petition against the bill being corrected, and that a condition be imposed on the opponents, that they should name the scheme they were here to recommend. The petition against the bill urged delay, and was headed by the name of Mr. Boyce, the chairman of the Royal Canal—a circumstance in itself suspicious. The petition of the Rathmines township alleged that a large meeting had, with the exception of seventeen, petitioned against their being compelled to take water from the Dublin corporation; but these seventeen must have been very plucky, for they attended at a meeting very carefully packed, and in a most chivalrous manner proved the superiority of the water which this bill sought to procure. In conclusion, he need only remind their lordships that the quality of the Vartry water was not disputed. Its quantity, though once arraigned, would be proved beyond dispute to be sufficient. It would yield a large revenue before it reached the city, and its machinery was simple. He hoped their lordships would compel the petitioners to name some plan which they were prepared to support.

After a short consultation,

The CHAIRMAN directed the learned counsel to call his witnesses.

Surgeon *Wilde* called, and examined by Mr. BARRY.

He said he was one of the census commissioners. The present supply of water to Dublin was clear at times and free from smell. At other times, it was offensive and nauseous to the taste. It was generally in the autumn that this nauseousness was detected. This arose from the existence of animal matter. He objected to a canal whose waters were stagnant, and intended for traffic purposes, being applied to culinary and domestic use. He had with him a sample of the spongillæ, which he had taken from the canal and from similar places. He took the specimens from the chamber of the reservoir and from the canal at Salins. The Vartry was a fine flowing stream. Every one who had a day's holiday went to fish in it, but the trout were never exhausted. The coloured water of Ballysmuttan would not be agreeable to the people of Dublin until some experience accustomed them to it. Indeed, it would be most unpleasant to wash one's teeth with.

Cross-examined by Mr. MALLEY: Knew Dr. Kennedy, who was one of the petitioners. He was one of the most eminent medical practitioners. Dr. Cusack, one of the petitioners, was the most eminent surgical practitioner in Dublin. Dr. Hans Irvine, president of the College of Surgeons, was a petitioner; so was Dr. Stokes, physician to the Queen. This want of unanimity on the part of the medical profession, with respect to the waters of the Vartry, might be attributed to want of knowledge on the part of the opponents. They had not examined it. The existence ence of the spongillæ was first reported on in 1851. Messrs. Cannock and White, who employed 260 persons, Messrs. Scott, Bell, and Co., Messrs. Switzer, Ferguson, and Co. were among the largest ratepayers in Dublin, and they also had petitioned against the bill. Has not any samples with him of the offensive water of which he complained. Had heard that many of his profession were dissatisfied with the evidence he had given before the Commons committee; but, attributed that to their want of information. At least, so it appeared when he conversed with them. The great bulk of the inhabitants of Dublin had not filters in their houses. Was sure that a great proportion of the persons who resided in the first and second class of houses in the squares did not make use of filters. Filters were the exception in Dublin.

Cross-examined by Mr. HUDDLESTONE: Had often been at the Vartry when there was little water there. At such times, the supply must be casual, but the same objection would apply to the Liffey.

Re-examined by Mr. BARRY: At a party of medical gentlemen present at his house, Dr. Adams, to his astonishment, showed that he knew nothing of the supply of Dublin. This was a sample of the knowledge existing among the medical men. It was possible for a medical gentleman to arrive at an eminence in his profession without knowing any of the dwellings of the poor. Filtration would not get rid of spongillæ.

Dr. *Corrigan*, examined by the Hon. R. BOURKE.

I was commissioner to the board of works during the famine in Ireland. Was acquainted with the sanitary condition of the poor. Good air, good food, and good water were necessary elements of health. To have good water, filtration should not be resorted to. The canal-water was unfit for human use. Filtration would not separate matter in solution—the ova of the animal matter—from the water. He need only show the truth of this by a simple chemical experiment. [Witness here performed the experiment, and also a variety of other experiments.] He produced samples of canal-water taken from the pipes which supplied the hospital with which he was connected, after several filtrations, and showed that in the last one, which was perfectly clear to view, there must exist much organic matter in solution.

By the CHAIRMAN: Would not say that all the deleterious matter was retained after filtration, but certainly some would be.

By Mr. BOURKE: There was an essential difference between a river and a canal. The object of a canal must be to secure stagnant water. If its rest were disturbed, the object of the canal would be defeated. A river, on the other hand, ever flowed and carried off all offensive matter thrown into it before it could injure the quality of the water. The canal, owing to its rest, and the light penetrating it, favoured vegetation. To provide a supply, you must also secure yourself against such impurities as may fall into the water, such as arsenic.

The CHAIRMAN: It would be better to point out the imperfections in the present supply, and not to suggest contingencies.

Witness: The impurities would not be affected by the choice of level. Only one-fourth less vessels passed over the high than the low levels. As there would be fewer boats on the upper levels, the water must be more stagnant. There was an increasing proportion of sickness in the union workhouses of Dublin, as contrasted with all the workhouses in Ireland. This was to be accounted for, in fact, by the impure water. The spring water used in the North Union was taken from an excavation near the Braddel, separated from it by a narrow wall of 12 inches thick. Indeed, it might be called the Braddel water filtered.

Cross-examined by Mr. MALLEY: Filtration was necessary to prevent dead animals and such large impurities getting into water. Manchester did not require filters: though the Thames water was filtered, it ought not to be. It was a proof that London water was dirty. Water in filtration went upwards in the chamber, and passed through gravel and charcoal. The stuff contained in the sample, he produced was retained in it for three months, from the 18th of March, when the chamber was examined until the 23rd of June, when the sample was collected. He did not bring with him a sample of the water supplied to the Whitworth Hospital. There might be an apparently pure sample, such as now exhibited, taken from the same sources as he had taken his. He had collected some of the impurities produced from the sides and bottom of the tank in the North Dublin Union. It did not follow that the sample now produced from the same source was perfectly pure. He had seen that the guardians of the North Dublin Union were in favour of the present supply.

The CHAIRMAN thought there was no necessity for pursuing this matter. It was a point of principle whether the canal was a proper source. It was admitted the subject had been discussed many years, and an impartial engineer had given his opinion. He wished to shorten the inquiry, and save expense.

Mr. O'MALLEY thanked his lordship for the opinion he had given. The petitioners against the bill were anxious to save expense. Their object was to show that the supply from the Vartry was not sufficient.

The CHAIRMAN: Then that brings the matter to an issue?

Mr. O'MALLEY: Precisely, my lord. Our entire wish has been to show, by our cross-examination, that Dublin is not in the position of a city perishing for want of water. We maintain that the canals will give it a supply until such time as a proper catchment can be secured. We do not consider the delay of twelve months so important, in comparison with the advantages which accrue from a proper investigation being made. Large expenses are about to be undertaken for what we consider a fruitless scheme—one dangerous and full of peril, and unlikely to answer the purpose which the promoters have themselves in view.

The CHAIRMAN: Let the scheme be laid before us.

Mr. CALVERT asked for an adjournment, as he was not prepared to examine Mr. Hawksley.

The CHAIRMAN: Surely, there is some evidence ready. I do not want to suggest to counsel, but our object is not to waste time.

Mr. *John Boyle*, examined by Mr. CALVERT.

He deposed that there was an insufficiency of water in cases of fire at Bachelor's Walk, at the Round Church, North Great George's Street, and Grafton Street. There was, he believed, abundance of water, but the mains were not sufficiently large to convey it. In Nelson Street, near the basin, the water would not come up, owing to the absence of pressure. On the 15th of May, there was a fire at Rathmines, and when he got to it, there was only one solitary water-cart there to extinguish it. There were no mains or fire-plugs in the district; but the man with the water-cart conveyed water to the Rathmines engine.

By Mr. MALLEY: The supply of water was under the control of the corporation, especially under No. 2 committee. Complaints were frequently made that the turncock was absent when the firemen reached the fire.

Cross-examined by Mr. ATKINSON: The Rathmines district was governed by commissioners of its own. Did not know how the several houses there were supplied.

WEDNESDAY, JULY 3.

T. Hawksley, Esq., examined by Mr. CALVERT.

Was a hydraulic engineer of great experience. His operations had been extended to all kinds of water-works. His duty in connexion therewith had been to ascertain the chemistry of water. Since 1855, he had been consulted by the Dublin corporation, and had paid much attention to the quantity of water; had examined all the districts, within a range of fifty miles, which would be likely to afford a supply; had from the beginning entertained the most favourable opinion of the Vartry. At that time, there had been no analysis of water, and everything was very vague. Stated to the corporation at that time that sufficient inquiries had not been made on which to form data. The inquiry slept from autumn, 1855, in consequence of the financial difficulties of the corporation, until the year 1858. Went to Dublin in 1858, and renewed the inquiries. The limit of the expense at that time was fixed at £200,000. This excluded the Vartry from further consideration. He recommended the canal-water in consequence, but at such a level as would afford high pressure near its source to secure purity; and reported that a guaranteed supply was indispensable. At that time, he visited the Vartry, and recommended it in his report. The canals were then practically in the hands of the two railway companies—the Southern and Western and Midland—so that the entire combination was very powerful. The granting of water was to be 10 million gallons—4 millions from the Royal, at a rent of £1000, and 6 millions from the Grand Canal, at a rent of £1500; the corporation to supply the necessary works to convey the water. The estimated expense was to be £199,000. At that time, the estimated expense of the Vartry scheme was £300,000. The canal companies would not come to any terms. They required the corporation to save and utilize their superfluous water, instead of giving a guarantee. The union of the Grand Canal and the Dodder was then contemplated. The cost came within the estimate of £200,000. It was approved by the water committee, but rejected by the corporation. The Grand Canal Company again failed to guarantee the requisite quantity. In August, 1859, on the death of Mr. Sweetman, witness was again called on. The result of renewed negotiations with the canal companies was again a failure, and the town council determined to look for a supply elsewhere. In the 147th page of the Blue-Book was contained the report of Mr. Bateman on the unadvisability of guaranteeing a supply. The corporation thought it advisable to increase the limit from £200,000 to £250,000, but this still excluded the Vartry. The Coyford plan was then projected; but, so powerful was the opposition of the canals, that it was considered advisable to lay the plans of the works, so as to cross the Grand Canal, in order that, if the canal companies defeated them in Parliament, they could still fall back on the canal. This was the foundation of Bill No. 1. The estimate of this, including contingencies, was about £233,000. During the progress of this bill, meetings were held in Dublin to prevent the corporation adopting that plan, and to compel them to resort to the canals. A good deal of feeling was excited by unfair prejudices, and the meetings decided against it, which caused the corporation to withdraw their bill, on the understanding that Bill No. 2 should be substituted. This required only a few alterations, but, in consequence of having to take some water from the Royal Canal, the Bill No. 2 was defeated, as technical notices had not been complied with. Should all schemes fail, there was no doubt that the city would be at the mercy of the canals. The canal companies, on the fresh negotiations, wished to leave the council as much in the dark as possible, and that their winter water must be impounded at the expense of the corporation. This would have raised the expense to £300,000, and the council thought it better to get the supply from the best source.

Mr. O'MALLEY suggested that, as Mr. Hawksley was not present at these negotiations, he could not be examined thereon.

Mr. CALVERT: You do not appear for the canals, and have no right to interfere.

Mr. O'MALLEY: I have a right to save the time of the committee when the examination is on points on which Mr. Hawksley cannot be expected to know anything of his own knowledge.

Mr. CALVERT: You are anxious to defend the canal companies.

Mr. O'MALLEY: I am not here to defend your attacks on the canals. I have no connexion with them here, and, so far as I believe, neither have my clients.

Mr. CALVERT: So you said in the other House, and yet the canal companies contributed to your expenses.

Mr. O'MALLEY: As taxpayers, they had a right to do so.

Witness then proceeded to point out the excellence of the Vartry scheme. The position was good. The evaporation was small, in consequence of the Vartry watershed being within eight miles of the sea. The works were simple in character. There were facilities for constructing the works, and the test could be reduced to a certainty. The district of the reservoirs was mountainous, the highest point being 2370 feet above the level of the sea. The general inclination of the lands was 1 in 20. The water was generally wholesome, as the soil was pasture or free from peat. There were only 1200 acres of peat in the Vartry, whereas in the Ballysmuttan district, the watershed of 16,000 acres contained over 12,000 acres of black peaty soil. The consequence was, that the Vartry works could never be more than slightly coloured, but the Ballysmuttan water must be generally brown. The mills on the Liffey must also demand large compensation from the promoters of the Ballysmuttan scheme.

Mr. *Hawksley* proposed to produce some specimens of the Vartry water, to show its clearness.

The Earl of SHEFFIELD: There is no necessity for this. Your case is that the colour of water is no test of its purity, and we have no intention of tasting it to judge of its merits.

Mr. *Hawksley:* The evaporation in this district, on an average of the three driest years, would be 12 inches. Had, since the investigation before the Commons committee, made calculations founded on 12 years observations. In the New Town watershed the evaporation from 1848 to 1855 had been 11·3 inches on an average, and, from 1848 to 1861, there had been an average of 12·7 inches. He could show there had been less loss by evaporation in dry years than in wet ones.

The CHAIRMAN said it is not necessary to go into these minute details. All we have to ascertain is whether the supply is sufficient.

Mr. CALVERT said that a great deal had been made of these minute points before the committee of the House of Commons.

The CHAIRMAN: You need not run the matter so fine.

Mr. CALVERT: I quite agree with your lordship. I will ask Mr. Hawksley this question. Have you, allowing for absorption and evaporation, satisfied yourself that the quantity yielded by the Vartry catchment will be sufficient?

Mr. *Hawksley:* I have. The Vartry watershed will yield 19 million gallons per day on an average of three dry years, and 12 million gallons daily, will be sufficient for the supply of 400,000 people. Mr. Hawksley proceeded to state the results attained by the Fassero rain-gauge, and those on which observations were made in the neighbourhood of Dublin. The allowance of 25 gallons per head daily, which the corporation proposed to give to a population of 400,000 persons was a large one, and very much higher than that in most of the great towns in England. The water of the Vartry was very soft.

Mr. O'MALLEY said he did not intend to dispute the quality of the water.

Mr. HUDDLESTONE said that it was his intention to offer some evidence on this subject.

Mr. *Hawksley* then proceeded to give a comparative statement of the degrees of softness of the Vartry water, and that supplied to London, Manchester, Glasgow, and other large towns. The Vartry water was softer than the water generally used in England. After the late drought, the yield per day of the Vartry was found to be 4,618,000 gallons, and of the Liffey at Ballysmuttan, 4,300,000 gallons. Taking equal areas practically, the yield of both districts was the same. [Mr. Hawksley then exhibited several photographs of the Vartry river in the Devil's Glen, and at other points.] Mr. Hawksley was proceeding to give the details of the estimates of the proposed works, when

Mr. O'MALLEY said: In order to save time, we have no objection that the witness should state the nature of the proposed works generally. We are not in a condition to contest the estimates, or the fitness of the works for conveying the water to Dublin. The great question which your lordships have to investigate, and to which we will direct our evidence, is the sufficiency of the supply, and it would be a waste of time to go into the details of the estimates.

Mr. HUDDLESTONE and Mr. RODWELL for the other opponents, said they would like to hear some evidence as to the estimates.

Mr. *Hawksley* stated briefly the nature of the proposed works, and the estimates, the particulars of which were fully given on the occasion of the former inquiry. He stated that all the proprietors who had not already been settled with were protected by the 64th clause of the General Water-Works Act. Mr. Tottenham, M.P., for New Ross, and proprietor of the Devil's Glen, had been settled with. The elevation of the Vartry district was sufficient to give water at high pressure to every part of the city of Dublin. With regard to the harbour of Wicklow, the Vartry came down into the tidal estuary. The length of the estuary was more than two miles, and it depended for its supply almost entirely on the tide. With respect to the cost of the proposed works, contractors had tendered for their construction, at a sum of £216,000. The usual cost of gravitation water-works was from £2. 10s. to £3 per head; and in Bradford the cost was as much as £5 per head; but, in this instance, the cost to the inhabitants of Dublin, including the additional piping for the extra-municipal districts, the cost of which was not included in the estimates, would not be more than £1. 5s. per head. The estimated revenue to be derived within the city will be £28,400 per annum, and the annual expenditure on the works, £24,000. He calculated that in

five years the revenue to be obtained from the extra-municipal districts would be about £10,000 a year, and the expense, about £5200. In ten years, he estimated the revenue from those districts at £12,500 or £13,000. The annual expense would not increase in the same proportion. The rates proposed to be levied under the bill were: the domestic water-rate, limited to 1s. in the pound, and the public water-rate, limited to 3d. in the pound. The full amount of the rates which the corporation would levy would be 1s. 3d., the same as were charged in Cork. The construction of the works would take about three years. Mr. Hawksley was then examined in reference to the lands of some of the proprietors who had petitioned against the bill; and stated that their rights were fully protected under the General Water-Works Act. There was no reason why Rathmines should be exempted from the operation of the bill. It was particularly a part of Dublin, and was at present without any water supply. The whole of these works were such as witness could safely recommend to the committeee. He fully concurred with the conclusions arrived at by the royal commissioner, and nothing had occurred to shake the opinions which he had uniformly entertained of the superiority of the Vartry above all other projects which had been suggested for the supply of the city of Dublin. He should mention that, after the inquiry in Dublin, the royal commissioner and his assistants spent two months in making a most careful examination of the district and of the estimates.

Cross-examined by Mr. O'MALLEY: The Fassero rain-gauge was about three miles from the edge of the Vartry water-shed. [Witness pointed out its position on the map.] The weir at which the yield of the Vartry was ascertained on the 30th of May last was near Anagollen Bridge. The opening on the weir was 10 feet wide. The natural drainage area up to that bridge was rather less than 15,000 acres. The gauge was not fixed until the day before the yield was ascertained. The yield of the river was taken frequently after the 30th of May. [Witness handed the returns to the learned counsel.] Mr. Hawksley then gave the comparative returns of the rain-gauges at Anagollen Bridge and at Ballysmuttan. The latter showed a large fall, which Mr. Hawksley attributed to a local storm at Ballysmuttan. On the 23rd of June, the wind was east; on the 24th, west-south-west; and, on the 25th, south.

The CHAIRMAN: Is it necessary to go into these comparisons, because, if you come to the conclusion that the quantity of water at Ballysmuttan is materially larger than that at the Vartry, would that have anything to do with the scheme itself, as regards the sufficiency or insufficiency of the supply to be obtained from the Vartry?

Mr. O'MALLEY: Yes, my lord, we think it very material. We want to show that there are vital defects in the Vartry scheme.

The CHAIRMAN: I do not think that by making Ballysmuttan more you make the Vartry less.

Mr. O'MALLEY: Suppose we show that there are torrents of rain falling on both sides, and that Ballysmuttan can catch it and the Vartry cannot, will not that be most material for the consideration of your lordships?

The CHAIRMAN: The witness states that which we must assume to be a fact until it is disproved—that an abundant supply of water can be obtained from the Vartry. If that be so, it does not signify that a greater quantity may be obtained from the Ballysmuttan river.

Mr. O'MALLEY: I think we shall be able to satisfy your lordships that the comparison is material to this inquiry.

The CHAIRMAN: Of course, we cannot control counsel, but we do not see what a comparison has to do with the question we have to decide.

Mr. *Hawksley's* cross-examination resumed: He stated that the yields of the Vartry and of the Liffey at Ballysmuttan had been ascertained, in order to set at rest a matter which was disputed before the committee of the House of Commons. It was alleged that the dry weather yield of the Liffey at Ballysmuttan was much larger than the dry weather yield of the river Vartry. Witness knew that the reverse was the case, and the gauge was therefore erected at his request, to set the question at rest. It turned out that the yield of both rivers was pretty much the same, that of the Vartry being rather the larger of the two. That was ascertained at the end of a considerable period of drought, and was the first comparison that could be made.

Mr. CALVERT: Perhaps my friend, Mr. O'Malley, will now tell us whether he intends to set up the Ballysmuttan scheme in opposition to the Vartry?

Mr. O'MALLEY: I will tell you nothing.

Mr. CALVERT: That is just what I expected. You are pursuing the same course here that you took before the committee of the House of Commons.

The CHAIRMAN: I can only repeat what I have already said, that the question which we have to inquire into, is the sufficiency or insufficiency of the Vartry as a source of supply for the city of Dublin. We are not guided by anything the committee of the House of Commons may have done. We know nothing of what occurred there, and have nothing to do with it. If it can be shown to us that the supply from the Vartry will not be sufficient, and that the water is bad and impure, it will be for us to consider whether such a scheme should be sanctioned by the committee. If, on the other hand, it is proved satisfactorily that the supply from the Vartry is ample for the purpose, and that the water is pure and wholesome, we shall then have to say whether the preamble of the bill is not proved. Here is a scheme before us. The question for the committee is, whether that scheme is good or bad. Is the water good, or is it bad? Is there a sufficient supply, or the reverse? I do not care what quantity of water falls at Ballysmuttan: it has nothing to do with the question we have to try.

Mr. *Hawksley's* cross-examination resumed. He stated, at considerable length, the results of the rain-gauges in the Vartry and Ballysmuttan districts, and said he could not tell what effects would be produced upon a river by uncertain amounts of rainfall. The cross-examination by the learned counsel was directed to this point for a considerable time. Finally,

The CHAIRMAN said: Nothing is so uncertain as the effect produced on a river by quantities of rainfall. I wish the learned counsel would address himself to other facts.

Mr. O'MALLEY: I labour under this difficulty, my lord; that I do not know the point to which the committee wish me to direct the attention of the witness.

The CHAIRMAN: The committee cannot instruct counsel. All they can say is—confine yourself to material facts.

Cross-examination resumed: Allowing 34 inches of rainfall for the Vartry, and 16 inches for evaporation, the result would be 19 inches of available rainfall for the supply of Dublin. That would give 16 million or 17 million gallons per day. There would be no deduction from this for compensation to the millowners, because they were to be compensated in money at their own request. Was not aware that the Rathmines commissioners had entered into a lease for twenty years with the canal companies to take water from the canals.

Cross-examined by Mr. RODWELL: Three gentleman of great eminence in their respective departments had sent in tenders for the construction of the works, at a sum of £216,000. Their tenders had not been conditionally accepted by the corporation. He believed the corporation would be obliged by their bye-laws to put up the contracts to public competition, but he thought in the case of gentlemen of such eminence as Mr. M'Cormack and the other contractors, it would be the worst thing they could do. The result of putting up the contracts to public competition would probably be that the works would be taken at a price nominally cheaper, but in reality dearer than if the tenders of these gentlemen were at once accepted.

The CHAIRMAN: The committee cannot interferfere with the corporation of Dublin as to the mode in which they shall dispose of these contracts. The question has often been raised whether it is a beneficial thing to put up great works of this kind to public competition or not? I have had a great deal to do with matters of this kind myself; but I do not want to offer any opinion on the point at present. I should be very sorry to tie down the corporation of the city of Dublin in such a manner as to compel them to put up these contracts to public competition.

Mr. RODWELL: My clients ask your lordships to insert a clause to the effect that the works shall be put up to public competition.

The CHAIRMAN: We will not insert such a clause. The corporation of Dublin is elected by the ratepayers, and is responsible to them for its acts.

Mr. *Hawksley* was then cross-examined at great length by Mr. HUDDLESTONE, in reference to the effect which would be produced on Major Cunningham's estate by the abstraction of the water of the Vartry.

Mr. HUDDLESTONE: Would you be surprised to learn that, in the year 1859, the stream of the Vartry, in the Devil's Glen, was so low as barely to supply the wants of the farmers, and people living in the neighbourhood?

Mr. *Hawksley*: It must be some mistake. I should be very much surprised to hear that such was the case.

Mr. HUDDLESTONE: Would you be surprised to hear that, in 1859, the water in the Devil's Glen, at a width of 10 feet, was only 3½ inches in depth?

Mr. *Hawksley*: I should not be surprised at that, because 3½ inches, over a width of 10 feet, would represent a large quantity of water. The best shed of all is that which does not supply a drop of water at all, except when it rains—namely, the roof of a house. If the Vartry had not a drop of water in it, I should say it might be a most excellent water-shed. In the best water-sheds, the rainfall all passes off in floods. That is the experience of all hydraulic engineers.

Colonel TOTTENHAM asked Mr. Hawksley some questions in reference to a stream which ran through his property, and which, he alleged, would be interfered with by the present scheme. It appeared, however, that the stream in question did not fall into the Vartry, and would not be interfered with by the proposed works.

Re-examined by Mr. CALVERT: The quantity of water to be obtained from a particular catchment-basin depends on the rain that passes over the country during the year, and not on the quantity which flows through the rivers. When the Liverpool Water-Works bill was before the committee, there was a great drought in the water-shed. The opponents of that bill were making the same case which the opponents are making here—that there would be no supply. Just while we were in committee, the weather broke, and 336 million gallons ran off in twenty-four hours, and that was from a drainage area of only 10,000 acres; whilst here we have an area of 14,000 acres. It is perfect fallacy to attempt to estimate the yield of a particular district, from the fact that, on a special day, the river was dry. Such a thing was never attempted before. If the Rathmines commissioners have entered into a contract with the canal companies for a supply of water, that is a proof that they are now in want of a supply. The people of Rathmines cannot be properly supplied from the canals, because they are lower than the Rathmines district.

Mr. CALVERT: Having heard the doubts suggested by my friends on the other side, is your opinion shaken as to the quantity of water which will be obtained from the Vartry?

Mr. *Hawksley*: Not in the slightest. I have no doubt that the supply from the Vartry will be most ample.

Mr. *W. McCormack*, M.P., Mr. *Cochrane*, member, in the North of England, of a firm engaged in the iron manufacture, and Mr. *Aird*, a contractor, were then examined by Mr. BARRY. Mr. McCormack stated that he had tendered for the construction of the two reservoirs; Mr. Cochrane, that he had tendered for the supply of the iron pipes; and Mr. Aird, that he had tendered for the laying down of those pipes. The amount of these united tenders was £216,305, which included all contingencies. They each stated that they had gone over the estimates carefully; and Mr. McCormack and Mr. Aird had examined the ground. They were prepared to bind themselves to execute the works for the amount of their respective tenders.

Sir *John Benson*, C.E., examined by Mr. BARRY. He stated that he had examined Mr. Hawksley's estimates for the proposed works, and that he considered them ample to cover all the cost. There were no engineering difficulties, and the works were of a remarkably simple character. He had examined the Vartry district, and believed it would yield an ample supply for the requirements of the city of Dublin. The water of the Vartry was remarkably pure and clear.

Sir *J. Benson* was cross-examined by Mr. MALLEY in reference to some defects in an engine which was used in pumping water at the Cork Water-Works, which water-works had been constructed by the witness. Sir John entered into an explanation of the matter, stating that he was not in any way responsible for the defects of the engine.

The CHAIRMAN asked what further evidence was proposed to be given?

Mr. BARRY said there was a great deal of engineering evidence, corroboratory of that already given by Mr. Hawksley.

The CHAIRMAN thought such evidence would be almost unnecessary, seeing that that given by Mr. Hawksley—a most eminent engineer, known to them all—had been lengthy, and very explanatory of the case for the promoters.

THURSDAY, JULY 4.

Captain *Glynn*, examined by the Hon. Mr. BOURKE.

I hold land on the banks of the Vartry. I am in the habit of seeing the river every day. I use it for domestic purposes. In the beginning of June this year, the river was in a very low state occasioned by the drought. It was unusually low this year. The wind is generally westerly when there is most rain, but the rain comes when the wind is in all quarters. It is a very wet district about there.

Cross-examined by Mr. HUDDLESTONE: My well-water comes from the Vartry. The river runs very low in dry weather. Sometimes you can almost walk across it. It was subject to fluctuations according to the weather. There was one great flood. It swept away a bridge. The greatest quantity of rain was in the winter.

The CHAIRMAN suggested that this line of examination was quite unnecessary, and said that no more witnesses of the same class need be produced.

Cross-examined by Mr. MALLEY: Had not known the stream to be dammed up to secure water for washing the feet of the sheep.

By Mr. DEANES, steward to Mr. Tottenham: There was no want of water for the mills in 1859.

Mr. *Neville*, city engineer, corroborated Mr. Hawksley's evidence. Since 1854, he had examined the Vartry, and gave it the preference to the other sources. The water, after rain, flowed freely into the Vartry basin, so that credit might be taken for a large part of what fell from the heavens. About 10,000 out of 24,000 houses in Dublin had no supply of water at all. A petition signed by 20,000 persons had been presented in favour of the bill.

Mr. O'MALLEY proceeded to examine Mr. Neville with respect to the contracts between the canal company and the Rathmines commissioners.

Mr. CALVERT objected. His learned friend was not the counsel of the Rathmines commissioners, and could not cross-examine on the point. The petition of his clients had no reference to it.

Mr. O'MALLEY said it was most important to show that one of the great sources of revenue on which Dublin depended would be cut off.

The CHAIRMAN allowed the question to be put.

Witness said he had heard that a contract was entered into by the Rathmines commissioners, but heard it yesterday for the first time.

Mr. *James Simpson*, hydraulic engineer, stated that he approved of the Vartry as a source of supply.

By Mr. MALLEY: He had not made any actual experiment to ascertain the quantity of water which would fall within the year.

By the CHAIRMAN: He had visited the Vartry in the spring of last year. The site of the reservoir was very fine. It would contain 240 million gallons, which would give twenty days supply.

The CHAIRMAN: Can you give any idea what quantity of water the Vartry would yield into the reservoir, independent of floods during a dry year?

Witness: I am sure that, on an average, in dry weather it would yield 15 million gallons daily; and in wet weather, double that quantity.

The CHAIRMAN: Is Mr. Cochrane one of the contractors of the Westminster Bridge works?

Witness: He is, my lord. I have myself purchased half a million's worth of pipes from him during my practice, and always found them good.

Mr. *Glaisher*, of the Greenwich Observatory, was then called.

The CHAIRMAN: This has nothing to do with practical experience, and we had better confine ourselves to such.

Mr. *Murphy*, a resident in Rathmines, deposed that the house valuation of that district was about £4500 a year. Fifty-eight houses had been built last year. There was an insufficient supply of water in the township. It was obtained by catching rainfall, by going to pumps, or by bringing barrels of water from the worst part of the canal. The houses were built in rows, closely adjoining. In case of fire, there were only two water-carts available, so that, in such a case, the inhabitants were almost helpless. The only stream in it was a sewer, of which the greater part was covered over. After the expression of opinion on the part of their lordships, he was sure none of the inhabitants of Rathmines would take the canal-water so long as they could get the beautiful supply from the Vartry.

By Mr. O'MALLEY: When he was a member of the commission, a resolution was adopted to get a more abundant supply than at present. Had never heard, till he came here, that an agreement had been concluded. Was not a member of the Rathmines commission now. Had too much respect for that body to imagine they would enter into an agreement with the canals after the opinion of their lordships, but did not mean to say that such was the opinion of the commissioners themselves.

By Mr. M'CULLOCH: Had heard that the agreement was to supply Rathmines with the canal-water for twenty-one years, but knew nothing about it.

Professor *Jukes*, as a resident of Rathmines, advocated the Vartry scheme. The pump-water in Rathmines was hard, and the rain-water dirty. Would take care that the commissioners did not supply him with canal-water, should they have entered into the agreement.

This closed the case for the promoters.

Mr. O'MALLEY, on the part of the petitioners against the bill, proceeded to state his case. He complained of the course taken by Mr. Calvert, in merely repeating to the committee of the House of Lords the instructions which he had received to guide him before the committee of the House of Commons, and endeavouring to connect the opposition before their lordships with the canal companies. He (Mr. O'Malley) on the former occasion had the honour to appear as counsel for the Midland Railway Company; on the present, he had no more to do with that company, or the representatives of the canals, than Mr. Calvert, in appearing here, might be supposed to have to do with some railway or other for which he had acted as counsel years ago. The gentlemen for whom he appeared did not wish to depend on the canal as a source of supply. But they were anxious that the case advanced by the promoters should be carefully examined and tested before the bill was allowed to be carried into effect, and a step had been taken which no after precautions would render useless. The circumstances had been made use of with the committee, that a petition signed by 23,000 persons had been scraped together. The learned counsel on the other side omitted to bring forward any evidence to show the quality of that petition. Indeed, the less said on the matter was in his mind the better. On the other hand, he had only to mention the names of the petitioners whom he had the honour to represent, and those names spoke for themselves. To that petition there appeared the names of men of the highest medical fame. The entire legal profession, the whole body of the clergy, headed by their archbishop, all urged the same prayer. The mercantile body of Dublin were also in support of the same view. The two representatives of Dublin, in the House of Commons, lent their support to the same side. There were petitions also from the boards of the two Dublin unions; and, to these he referred, for they were well calculated to give an opinion on a subject with which the interests of the poor were mixed up. In the names of these men, he ventured to say that the city of Dublin was not perishing for want of water, and that, until the Vartry supply was properly tested, the citizens of Dublin were not to be compelled to enter on an expensive and perilous experiment. Mr. Neville, it was true, deposed that there were 10,000 houses in Dublin unsupplied, but that deficiency was not because there was not water, but because the corporation did not choose to go to the expense of laying down main-pipes through the district in which those houses were situated. He need hardly remind their lordships of the expense to which a corporation or a town was subjected, if the supply should really fail. Mr. Simpson had shown in his evidence elsewhere, and it would be proved here, that his experiments at Newcastle, on which the supply of that town depended, had proved valueless, and that enormous expenses had been in consequence incurred. The noble lord, who presided over this committee, had been once called upon to consider what remedy should be devised, because the supply afforded by a river scheme proved insufficient, and indeed his experience as president over the Board of Works must have furnished him with many similar cases. Proceeding to the question of the Vartry supply, he observed that Mr. Hawksley had a great character as an engineer; but he (Mr. O'Malley) might venture to assert that the varied experience for which he claimed credit, would not, at any rate, gain him a reputation for sound judgment. It was to this weakness he attributed the readiness with which a man of his eminence and scientific knowledge allowed himself to juggle with every plan advanced by the corporation. No instance could be adduced in which Mr. Hawksley had ventured to contradict or impugn a plan advanced by that learned body. He never seemed to stand on his scientific fame, or, in a single instance, to dispute a plan brought forward by his friends—the corporation. Whether the canal, or the Coyford, or the Vartry scheme was the one which the corporation leant to, he was equally prepared to carry out all. He (Mr. O'Malley) humbly submitted that the professional reputation of Mr. Hawksley should not have much weight in the case. There were two ways of testing whether there was an abundance of water in any basin; one founded on hypothetic deductions, the other on actual experiment. Where were the experiments in the present case? It appeared, from evidence in another place, that, since the 1st of May last, rain-gauges had been set up in the district, but not one of them had been produced. He admitted they had been insufficient tests, and were not conducted for a sufficiently long time; but still they might have been submitted to the scrutiny of the committee. There was not a single piece of evidence adduced by way of experiment, unless the height of the water over the weir at Anagollen Bridge, on a particular day in the month of June of the present year. There was no other test than that afforded by hypothetic deductions. The deductions were, in this case, useless. A rain-gauge, set up at some distance from a catchment, was no criterion. Ballysmuttan was not far distant from the Vartry; and yet, if a proximate gauge was to be depended upon, the rain-gauge in the former district would show that five times the quantity of rain would fall in the Vartry which would have been recorded by a gauge in the Vartry district itself. This was of importance; and, by Mr. Hawksley's own admission, an error of 1 inch would deprive 50,000 people of their day's supply, and that an error of 8 inches would ruin the city of Dublin from a want of water. The chairman had already suggested that hypotheses were not to be depended upon, but that facts must be produced. He thought he had said enough to confirm his lordship in that opinion. To enable the committee to form a judgment of the value of the corporation's experiments, he submitted the following paper, showing the result of observations of the number of gallons passing through the river Vartry, at Anagollen Bridge, in the month of June, 1861, according to the corporation measurements:—

June 1	. .	5½ million gallons.
2	. .	13¾ ,,
3	. .	8¾ ,,
4	. .	6 ,,
5	. .	6 ,,
6	. .	6 ,,
7	. .	4¾ ,,
8	. .	5 ,,
9	. .	4¾ ,,
10	. .	4¾ ,,
11	. .	5 ,,
12	. .	6 ,,
13	. .	5¾ ,,
14	. .	4¼ ,,
15	. .	4 ,,
16	. .	4 ,,
17	. .	3¾ ,,
18	. .	4¼ ,,
19	. .	4¼ ,,
20	. .	4¼ ,,
21	. .	4¼ ,,
22	. .	6¼ ,,
23	. .	6¼ ,,
24	. .	5¼ ,,
25	. .	14¼ ,,
26	. .	8¼ ,,
27	. .	5¼ ,,
28	. .	4¼ ,,
29	. .	4¼ ,,
30	. .	4 ,,
Total		175 million gallons.
		360 million gallons required for a supply of 12 millions per day.

During this month, according to the corporation rain-gauges, 3·45 inches of rain fell in the Vartry catchment-basin.

3·45 inches of rain = 1054 million gallons.

These observations showed that a perilous experiment was being tried in the present instance—an experiment which he hoped would not receive their lordships support.

The Rev. *Joseph Galbraith*, F.T.C.D., was then called. He said that he was much engaged in meteorological observations, and had made calculations on rainfall for the last twenty-two years. Was a member of the committee appointed by the citizens of Dublin to oppose the progress of this bill; and, as such, drew up the document read here, which requested the corporation to suspend their expenses in connexion with the plans for twelve months. That appeal to the corporation was rejected. Had heard Mr. Hawksley's evidence, and thought his calculations fallacious. They were all of a hypothetic character, and must lead to a fallacious result. By a comparison of the Fassero and Mountjoy gauges, he estimated the probable minimum daily supply at 19 millions. He calculated 35·6 inches as the average rainfall for the dry year. But observations actually showed that, in 1853, 1854, and 1855, the driest years, the average was only 29·16 inches, or a deduction of 6·44 inches from Mr. Hawksley's estimates. To proceed from 29·16, and use Mr. Hawksley's own numbers, there would be, not 19 million, but 13½ million gallons of water supplied. He did not agree with Mr. Hawksley in the loss on the average of evaporation, but used his own figures for the purposes of agreement.

Lord CHURCHILL thought it would be quite sufficient to take one year, the driest, and calculate therefrom. The opponents of the bill were weakening their own case by taking an average. Surely, if the reservoir failed in its supply for any one year, quite sufficient would be shown for their purpose.

Mr. O'MALLEY wished to show even on the promoters best case that there could not be a reliable supply.

Mr. *Galbraith* then proceeded to make the same deduction for the driest year, 1855, and calculated the result at 25 inches. He disputed the laws on which evaporation was made to depend on Mr. Hawksley's evidence. Where the drainage area was small, a matter of an inch was most important as thereon depended the supply for twenty-five days. Such a fault would not be material in the case of the Coyford scheme, for instance, which was made to depend on a large area. He objected to the Fassero gauge being the criterion on which to calculate the amount of water which the Vartry district would yield. He refused to adopt the correction for evaporation laid down by Mr. Hawksley. It was a random figure. The corporation had supplied him with an estimate, made on six observations daily during the month of June last, of the number of gallons flowing over Anagollen Bridge. From these calculations should be deducted 1-6th owing to the drainage area having been reduced by the corporation. At first, they had included twenty-

six square miles in their drainage, but now it only contained twenty-one square miles, owing to the corporation having decided to give a money instead of a water compensation. The highest quantity of water which fell over the weir was on the 25th of June, 14½ gallons, and on the 2nd of June, 13¾ gallons. These were the only days which would yield the required supply. According to the corporation rain-gauges, 3·45 inches fell in the Vartry basin, and 3 inches would give an estimate of 1054 million gallons which fell in the month, of which only 175 millions would be available for the purposes of the city of Dublin. Mr. Galbraith here proceeded to make some calculations on Mr. Hawksley's hypothesis.

Lord AVELAND: But the month of June was taken as an average month; and, on looking over the results in the table, I find the month of June varies very much.

Mr. *Galbraith:* My lord, this is but an additional proof of the fallacy of Mr. Hawksley's hypothesis. I wish to show that the month of June in this year was not on an average a dry month, and that its yield was not sufficient. I took June on an average of eight years, and the years 1859 and 1860 are not contained in the Blue Book. I take the actual fall in this month at 3·45, and this is the average of the eight years. That is about one-twelfth of the amount of rainfall in twelve months of an average year for eight years.

Lord AVELAND asked the rainfall in the year 1860, and the month of June of that year.

Mr. CALVERT: In 1860, the rainfall was 57 for the year 1860; for the month of June, it was 9·73. To include that year, would be more unfavourable to the corporation.

Examination resumed by Mr. O'MALLEY: He had selected the month of June because it was the only one on which the corporation afforded data. It was impossible to make any theoretic calculations that would bear comparison with practical facts. It was the opinion of all independent men in Dublin that the Vartry scheme was a dangerous one, on the grounds that no actual proof had been given that the Vartry scheme would afford a sufficient supply, and that a supplementary plan at great expense would be necessary. If proofs were given of this, he was sure that those parties would withhold further opposition.

Cross-examined by Mr. BARRY: The same body of citizens who opposed the progress of the bill in the House of Commons were still of the same opinion. He did not think the canals would be a good source of supply for Dublin, and never thought so. The Coyford scheme, on which no question of supply could be raised, was opposed in the Commons; but not by the same petitioners who were now present. He coincided with Mr. Hawksley that there would be less evaporation in dry weather than in wet. If ground were dry, much more of the rainfall would be absorbed than if the soil had been saturated before.

By Mr. O'MALLEY: The Anagollen height caught the water reserved by the corporation for compensation, but which was now omitted from their plans, as the millowners preferred a money compensation.

Professor *Mc Dowell*, F.T.C.D., said he had gone over the calculations made by Mr. Galbraith, and came to the same conclusion with him that the city of Dublin should not depend on those results for a supply.

Mr. *Robert Longfield*, M.P., said that he was well acquainted with the Vartry district, and that from the month of March until the return of winter this stream was a contemptible one from the head of the Devil's Glen to its source. He had lived over twenty years in Dublin, and was sure it would be in accordance with the wishes of the owners of property there that delay should take place until this matter be properly investigated.

This closed the case of the citizens who opposed the bill, as the committee declined to allow an adjournment till the following day to enable engineering evidence to be given.

Mr. WEBB, who appeared for the trustees of the Cunningham estates, proceeded to point out the injury which their property would suffer by the withdrawal of water from their tenants springs. If the streams above the reservoir were still reserved for the purposes of this property, to enable the tenants to make use of them for washing their sheep, and for the general purposes of their farms, much of the difficulty would be overcome.

The CHAIRMAN thought the introduction of clauses would remedy the difficulty. If a consultation between the parties did not meet the mischief complained of, the committee could take the matter up afterwards; but, surely, this was not a question which affected the preamble.

Mr. HUDDLESTONE, Q.C., feared the promoters would regard it as an essential point, and that they would not yield on consultation. He was not inclined to abandon the vantage ground he possessed.

After some consultation,

Mr. HUDDLESTONE announced that his clients would not oppose the preamble, but would reserve their further opposition until they came to the clauses.

The room was then cleared, and, after a ten minutes interval, the public were again admitted, when

The CHAIRMAN announced that, in the opinion of the committee, the preamble had been proved.

FRIDAY, JULY 5.

Mr. WORDSWORTH, who appeared for the Rathmines commissioners, asked the committee to insert a clause with the view of providing against the streets of Rathmines being broken up by the corporation.

The CHAIRMAN suggested that a difficulty might arise with regard to the insertion of a clause of this kind, if Rathmines were a sort of intervening district, through which the pipes from the Vartry to the city were to pass.

Mr. WORDSWORTH said there would be no objection on the part of the Rathmines commissioners to provide that the pipes from the Vartry might run through the district.

The CHAIRMAN said the Dodder was now out of the question, because the supply would have to be obtained from the Vartry, the pipes from which must necessarily pass through Rathmines. He had no objection to hear evidence, but he wished it to be confined to the quantity and quality of the supply obtained by the Rathmines district.

Mr. *Evans*, one of the Rathmines commissioners, was then examined. He said he had filled the office since the year 1847, when the Act of Parliament was passed constituting the commissioners. The pump-water was of good quality, and there was no difficulty in the way of the inhabitants obtaining a good supply. He had never heard any complaint from them on the subject. A resolution against the present bill, so far as it applied to Rathmines, had been adopted at a meeting of the inhabitants, with only five or seven dissentients. The number of persons present was about 200. A poll of the inhabitants was subsequently taken, when 290 were against the bill, and only 17 in favour of it.

Cross-examined by Mr. CALVERT: Considered the present supply to Rathmines a good one. The pump-water came from a limestone soil. Was not a chemist, and did not know the hardness of the Rathmines water. If the ratepayers were to pay for another water supply, he thought it would be mischievous. He was aware that the provision for supplying Rathmines under the present bill was only permissive.

The CHAIRMAN: Then, if so, what is your objection to it?

Witness: We object to the Dublin corporation coming into Rathmines at all. We believe that this bill will be the commencement of a movement to annex Rathmines to the city of Dublin, to bring it under the control of the corporation, and to make the inhabitants contribute to the Dublin rating. That topic was discussed at the meeting of ratepayers.

Lord AVELAND: Are you aware that, from time to time, water has been sold in carts throughout Rathmines?

Witness: I am.

Lord AVELAND: And do you really believe that the respectable houses, in a neighbourhood where such a thing takes place, can be said to be properly supplied with water?

Witness: I do. I have several houses in Rathmines, and I never heard any complaint from the occupiers of them as to the want of water.

Mr. *Richards*, secretary to the Rathmines commissioners, gave similar evidence.

The CHAIRMAN: The committee are of opinion, from the imperfect character of the supply of water in Rathmines, that the inhabitants ought to have the opportunity which would be afforded them by the provisions of this bill, of obtaining a better supply, if they think necessary.

A discussion then took place in reference to the case of the trustees of Major Cunningham's estate, who feared that their rights would be interfered with. The committee refused to alter the clauses objected to, and suggested to the trustees to make arrangements with the promoters.

Mr. O'MALLEY objected to clause 5, which provided that the incorporation of the Water-Works Clauses Act of 1847, should not in any manner prejudice any title to right of privilege or power conferred upon or vested in the corporation, under or by virtue of the recited Acts, or any of them. His clients apprehended that the proposed exception would render the incorporation of the Water-Works Clauses Act with the present wholly nugatory. He therefore proposed the introduction of certain words, which he thought would have the effect of preventing the corporation from evading any of the obligations imposed by the Water-Works Clauses Act.

Mr. BARRY said that various rights, privileges, and duties, were conferred and imposed on the corporation by the Acts in question, and the exception in clause 5, was intended merely to prevent the incorporation of the Water-Works Clauses Act from interfering with any of those rights or powers.

Mr. O'MALLEY submitted that it was most objectionable to allow the corporation, by an exception of this kind, to evade the obligations imposed by a public Act.

Mr. CALVERT having been heard in reply,

The CHAIRMAN said the clause proposed was a very common one, and such as the committee thought ought to be inserted in the bill. It was objectionable to hamper and restrict unnecessarily the operations of a public body like the corporation, who were selected by the ratepayers, and were responsible to them for their acts.

On clause 34, exempting Trinity College from the domestic water-rate,

Mr. BROWN, the Parliamentary agent applied, on behalf of the Royal Dublin Society, that it should also be exempted from liability to that rate. It was a scientific society, having a public library and museum, and was supported principally by a public grant. He submitted that it was entitled to exemption on the same grounds as Trinity College. At present, the water-rate of the society only amounted to 4s. 3d. per year, but, if not exempted from the operation of this bill, the rate would be £78 odd. They had no right to be included in the bill, for they did not take water from the corporation.

Mr. CALVERT said it was true that Oxford, Cambridge, and certain other great public institutions were exempted from the payment of such rates under the Public Health Bill; but, the Dublin Society, although it received a parliamentary grant, was in no respect a public society, and stood on the same footing as other private companies.

The CHAIRMAN: We object altogether, as a matter of principle, to the exclusion of this society from the operation of the bill.

The Admiralty clause, 38, was next objected to by

Mr. O'MALLEY, who said it was so contrary to common sense that he thought it obligatory on the committee to amend it. He contended that the effect of the clause was that the standard of the depth of the harbour at high water, ascertained by surveys at the time of the passing of the Act, was to be considered the standard of the depth at low water.

Mr. BRYDEN stated that the Lords of the Admiralty had directed the word "standard" to be changed to "criterion," which met the objection of the learned counsel.

After some discussion,

The CHAIRMAN said that the alteration removed all objection to the clause, which was accordingly passed.

Mr. O'MALLEY objected to the exception in clause 42 by which the corporation were relieved from the duty of supplying water at high pressure in the case of houses at too great an elevation to be supplied to the top story from the pipes of the corporation as laid in any street adjacent thereto. This appeared to him to go against the whole principle of the bill. The object proposed was to supply water at high pressure, and the pressure given by the present scheme was calculated at 250 feet, but by the clause the obligation to supply water at high pressure was dispensed with.

The CHAIRMAN: What I understand is this: there will be a great reservoir in which the water will be stored, and there will be another reservoir from which it will be distributed to the houses in Dublin. The latter was stated to be of ample elevation for the supply of water at high pressure, which it is the intention of the corporation to give to the citizens. The question is, how this clause interferes with that intention?

Mr. MALLEY: They assume the fact that there are houses in Dublin too high to be supplied at the top stories, whereas the whole evidence given by the promoters assumes that there is no such thing.

Mr. CALVERT: It is simply the clause, which is always put in bills, to save the persons who supply the water from being called upon to do impossibilities. The corporation propose to supply water at high pressure to every house in Dublin; but a man might think proper to build a house twice as high as the highest now in the city, which it would be impossible to supply at the top story; and these words are introduced to prevent the corporation from being called upon to supply water at high pressure to such a house.

The CHAIRMAN said the water must find its level, and those houses which came within the level of the reservoir must be supplied. We will pass the clause.

Mr. MALLEY objected to clause 51, by which the corporation were empowered to recover arrears incurred by any occupier, or, in case any person supplied with water did anything in contravention of any of the provisions of the Act, to cut off the pipes by which water was supplied to him, or to the house or premises that he occupied.

The CHAIRMAN said, some years ago a bill promoted by a gas company came before a committee of the House of Commons, of which he was chair-

man, and which contained a clause giving the company power to charge incoming tenants with the arrears incurred by former tenants. This he considered objectionable, and accordingly struck out the clause. He wished to know whether there was anything of that kind in the present bill?

Mr. CALVERT replied that the intention of the corporation was to have power to recover arrears from the person by whom they were incurred.

The CHAIRMAN: All I want is to protect the incoming tenant from any charge for arrears incurred by the outgoing tenant, or to be deprived of a supply of water, because the rate due by the previous occupier was not paid. You had better take that into consideration, and we will postpone the clause for the present.

Mr. BARRY proposed to their lordships to amend the clause by omitting the words "house and premises," which would have the effect of confining the penalty to the offender. This was approved of by the committee, and the clause as amended was agreed to.

Mr. MALLEY objected to clause 52, by which the present pipe water-rates are to continue until rates are struck under the Act. He observed that the present taxation of Dublin was very high, and that the new system of water-works would increase that taxation. The corporation were not limited to any time for the construction of their works; and, according to this clause, they would have power to levy rates without affording any corresponding benefit to the citizens.

Mr. CALVERT said this was a most improper objection. The provision as to the levying of rates, was a matter peculiarly within the province of the House of Commons; and it was the first duty of those parties to have appealed to that House on the subject. They had not, however, raised the objection before the committee of the House of Commons. He would now proceed to show their lordships how exceedingly improper the objection was.

The CHAIRMAN: You need not trouble yourself; we will pass the clause.

Mr. MALLEY rose to object to other clauses, but was stopped by

The CHAIRMAN, who said: The committee expressed an opinion, at an early stage of the proceedings, that they could not hamper the corporation of Dublin with any such restrictions as were sought to be imposed on them, in reference to putting up their works to public competition. Strictly speaking, the opponents have no right to be heard on this point; but, if any suggestion could be made for the benefit of the community, of course, we should be glad to hear it; but we cannot interfere with the powers of the corporation—a body elected by the ratepayers, and responsible to them for their acts.

The remaining clauses were then considered, and passed.

Mr. O'MALLEY said he had been instructed to request the insertion of a provision to the effect that the purchase of lands, and the execution of the works, should not be proceeded with until such time as the quantity of water which the Vartry district was capable of yielding, had been ascertained by actual experiment.

The CHAIRMAN: That would be to throw the responsibility on the corporation. It will be their duty, having obtained the sanction of Parliament, to proceed to carry their scheme into execution. If they are to delay the construction of their works, in order to ascertain the yield of the Vartry, what would be the use of the committees of the two Houses of Parliament having received evidence on the subject?

The proceedings terminated.

STOCKPORT DISTRICT WATER-WORKS.

TUESDAY, JULY 9.

Sir W. ALEXANDER, Q.C., Mr. RODWELL, Q.C., and Mr. CRIPPS, appeared for the promoters; the bill was opposed by Mr. JOHNSON and Mr. WEBSTER, for the old water company, and Serjeant WHEELER and Mr. JACKSON for certain millowners.

Sir W. ALEXANDER said the object of the bill was for the better supplying the borough of Stockport with water. Up to the present time the town had been supplied with water by the old company, who pumped their supply from the Mersey. The spinning-works and print-factories, however, had of late years so extended along the banks of the river, and so polluted the stream, that it was totally unfit for drinking. It was, therefore, necessary that some other source should be adopted; and the promoters of this bill had a scheme, by which they could at a moderate outlay supply Stockport with an abundant quantity of good and wholesome water. The place from which the company intended to get their water was Lyme Park. They intended to erect three large reservoirs, two of which were to be connected with each other, and the third united to the other two by means of a fork-line from the main-pipe. It was proposed to have some filtering-beds at Norbury, for the purpose of giving additional purity to the water, and from thence it would be transmitted to a place at a considerable elevation above Stockport, so that the town would be supplied by the force of gravitation, on the most approved plan. The Lyme Park gathering-ground was a lofty range of hills, which would be occupied altogether as park ground or pasture. From the nature of the geological formation, the water was of a remarkably pure and soft quality. The works were of a simple character, and the estimated cost for the whole was somewhere about £80,000. As regarded the opposition, he was glad that they had not then Colonel Davenport against them; they had still, however, the old company to contend with; but, after the evidence on both sides had been heard, there would be no doubt that their lordships would be of opinion that the bill ought to proceed. There could be no question about the undertaking being a *bonâ fide* one, promoted by the persons named in the bill, for the good of the town of Stockport.

Mr. *John Lowe*, examined by Mr. CRIPPS.

I am a surveyor at Manchester. I have been engaged for twenty-five years in taking surveys in the neighbourhood. I know the course of the rivers Goyt and Etherow, and the smaller streams that run into them. I have examined the different works that now exist on those two streams. I have seen the map containing those works, and I believe that it is accurate. I have examined the works themselves to see if the map was correct. I found discharges of various kinds into the stream from those works. Some of the works are on a very large scale. The discharges generally are of a very noxious character. I took some of the matters that are discharged into the stream at various points. [Several bottles, containing the specimens alluded to were then produced.] The Etherow takes its rise between Yorkshire and Derbyshire, and flows westward. The inhabitants of Manchester are supplied with water from the river Etherow. The distance from the source to the Manchester water-works is about 7 miles. The distance from the junction of the Etherow with the Goyt to Stringer's weir is about 5 miles. The population of the district is about 60,000. In the census of 1851 it was 48,000. I know the water supplied to Stockport. In my opinion, it is not good. I believe the inhabitants are very unwilling to use it. I am acquainted with the Manchester reservoirs. I saw them lately; they were very short of water. At the time I visited the works, they were pumping from a well. I found the middle reservoir empty.

Cross-examined by Mr. JOHNSON: I am a resident in Manchester, and drink the water supplied by the Manchester Water-Works. I have not chemically examined the Stockport water. I know it undergoes a process of filtration, but I do not know what that process is. Some of the works I visited were on the Goyt, and some on the Etherow. I cannot say when these works were erected. I was engaged by the promoters of this bill to make an examination of the works.

Re-examined by Mr. CRIPPS: The works have been increasing all along the stream since I first knew it.

Mr. *Eskrigge*, examined by Mr. CRIPPS.

I live at Stockport, and am well acquainted with the town, and the surrounding district. The water at present supplied to the inhabitants is unfit for domestic use. There are several public pumps in Stockport which are resorted to by the inhabitants as much as possible. I think the time has come when somehow or other a better supply of water must be given to the town. I know the course of the river Goyt. I know that there are several manufactories on the banks of the river. The discharges from these different mills pollute the stream very much. I know the site of the proposed works at Lyme Park, and I think it is the only place near Stockport from which a supply of pure water can be obtained. The land is pasture land. It is not a spot in which the population is likely to increase very much. The matter has been discussed by the town council several times, and at a meeting held on the 5th of June a resolution was passed disapproving of the scheme for supplying water from the Manchester reservoirs. It was decided that we should support the bill now before the House. The Manchester corporation get their supply from the river Etherow; and, if they take an additional quantity from it in order to supply us, we were afraid it would diminish the quantity of water coming from the Etherow to us. The population of Stockport has been increasing very slowly. The general feeling in Stockport is very strongly in favour of this bill.

Cross-examined by Mr. JOHNSON: I have resided in Stockport for eighteen years. I only use the water supplied by the present company for baths. I have never made any complaint personally about the water. I believe none of my workpeople have ever complained. I have two spinning mills. I am in the habit of putting cinders into the stream. I am not aware that there has been any lack of water. I believe the old company have expended about £66,000 on their works. I think this bill, if passed, will drive them away. I have a well at my own private residence sunk in the old red sandstone strata, the water from which is very good.

Re-examined by Mr. CRIPPS: There is a very strong feeling in the town in favour of the old company; but, notwithstanding that, the inhabitants feel they must have a better supply of water. Though I have made no complaints about the water myself, it is notorious that complaints have been made.

Mr. *John Whitaker*, examined by Mr. CRIPPS.

I am borough surveyor for the town of Stockport. I know the source of the present water supply; I was appointed on a committee to inspect the river Goyt and the various streams which flow into it for the purpose of investigating what matters were discharged into it, from the different works. In the course of that investigation, we went along the whole course of the stream. There is a considerable population in the district. I prepared a report for the committee with reference to the state of the river. [The report was read. The witness also produced specimens of rags very much discoloured, which had been tied over the taps which supplied the houses with water.] I have seen water sold in the town from carts at a halfpenny per can. The people are in the habit of resorting to the pumps. The old company's pressure is not sufficient to carry the water to the upper part of the town in case of fire. I think a good supply of water can be got from Lyme Park.

Cross-examined by Mr. WEBSTER: I have never known any complaint made of the pressure in case of fire in the upper part of the town, because there has never been a fire there. Some of the works on the stream have been recently erected. The corporation have no power to prevent the millowners putting things into the stream. They have taken no steps to get a better supply of water.

Mr. *George Chapman*, examined by Mr. CRIPPS.

I was lately the mayor of Stockport. I know Lyme Park. I think it is the most eligible place for the supply of water to the town. There is a strong feeling in favour of this scheme. I was one of the committee appointed to examine the works on the stream. I can confirm the evidence of the last witness on this subject.

Cross-examined by Mr. JOHNSON: I believe no public meeting on the subject has ever been held in Stockport. I do not think the Manchester people can supply us with water. I know of no objection to the Manchester water. I do not use the water supplied by the Stockport Company for domestic purposes.

Mr. *Joseph Oymall*, examined by Sir W. ALEXANDER.

I have lived in Stockport five and a half years. My house is supplied with water from the company's works. It is of a very bad quality, both as to taste and appearance. We only use the company's water when we do not like to trouble our neighbours for water from their wells. My house is on the highest level.

Mr. *Henry Higinbotham*, examined by Sir W. ALEXANDER.

I am a surgeon in practice at Stockport. I am a member of the corporation. I object to the water supplied by the company, but I am obliged to use it. I should not think that any filtration would render it fit for drinking purposes. There is a large population on the side of the stream. All the sewerage flows into the stream.

Cross-examined by Mr. WEBSTER: I think the new company will be able to furnish a much better supply of water than the old company. It is impossible to trace any sickness directly to the water. Stockport is situated in a healthy position. I do not know the rate of mortality.

Mr. *W. H. Hayes*, examined by Mr. CRIPPS.

I live at Hazel Grove, about two and a half miles from Stockport, on the line of supply. The population is about 5000. The inhabitants are now supplied with water only from wells. It would be a great addition to the health and comfort of the town if it could be supplied from Lyme Park. I am acquainted with the nature of the water at Lyme Park. I have made several microscopic examinations of it. It is the purest water in the district.

Cross-examined by Mr. JOHNSON: There are several manufactories at Hazel Grove. They have wells attached to them. I have two wells of my own, but there is not enough in quantity. I have tried to deepen my well, but without success.

T. Spencer, Esq., examined by Sir W. ALEXANDER.

I am an analytical and consulting chemist, and a Fellow of the Chemical Society. I am consulting chemist to the New River, and several other water companies, and to the corporation of Liverpool. For some time, I have been professionally engaged in questions relating to the supply of water to towns. I have analyzed water from most of the large places in England, and have become acquainted with the gathering-grounds of different companies. I have examined the district of the Lyme Park gathering-ground. It is a

very good gathering-ground. I consider it to be a good place from which to get a supply of water. I believe the quality of the water to be very good. I have analyzed samples of the water. The hardness of the water taken from Elmhurst Brook was 5·7°; and, from Bollinghurst Brook, 5·6°. The organic matter in the water from Elmhurst Brook was 0·70, or about three-quarters of a grain; and, from Bollinghurst Brook, 0·60, or a little more than half a grain. There was an entire absence of animal matters. The water is very agreeable to the taste. I tested the samples for nitric and phosphoric acid, which generally indicate a high state of manure on the land; but I could not find them. I also examined some water taken from the pipes supplied by the old company. I do not know what system of filtration is employed, but it does not take the impurities out. I know the district of Lyme Park to be a rainy one generally. The subsoil being a fine millstone grit, it is favourable to the quality of the water. The red sandstone strata does not generally yield much water. The sandstone at Stockport is not water-yielding. I have made a geological examination for the purpose of ascertaining this. I analyzed the water taken from the red sandstone, and it was exceedingly hard. One of the samples produced was taken from a well at the gas-works, 14 yards deep. The hardness was 49°; but, on mixing it with lime, it was reduced to 25°. The other sample was 31° of hardness, and was brought down to 22°. It is not fit to supply the town. I received some samples of mud from Mr. Lowe. I analyzed them, and found arsenic very abundant in them. There were three samples. I supplied a part of them to Dr. Taylor. I did not give him a portion of the water in which I found the arsenic.

Cross-examined by Mr. WEBSTER: It is not general to find arsenic in sand. My knowledge of this district is derived from geological information as well as from actual experience. I know Dr. Clarke's process of softening. The hardness of the Stockport water cannot be reduced very much, on account of the sulphates which it contains. I have a process that will cure almost all waters, and which acts in a most wonderful manner. It is a magnetic-iron process. I have been to Lyme Park. I cannot imagine that there is any workable coal there. There are some thin seams of coal in the Liverpool district. I have analyzed the water at Lyme Park. There was only a small portion of vegetable impurity in it. The hardness is 5·7.

Re-examined by Sir W. ALEXANDER: I believe they would fail in getting water from the sandstone strata. I believe the Manchester water is very hard, and that it contains nitric and phosphoric acid.

Dr. *Alfred Swayne Taylor*, examined by Mr. RODWELL.

I am a professor of chemistry at Guy's Hospital. I have received some samples of water from Stockport, and have analyzed them. I agree with what the last witness has said with regard to that water. In my opinion, it is not fit for the supply of any town. I have analyzed some mud which was sent me by Mr. Spencer. I agree with Mr. Spencer that the water connected with that mud is unfit for drinking purposes. I have got some arsenic which I procured from that mud. It is a small quantity; but one ought not to find it in that small quantity of mud. I formed my opinion independently of Mr. Spencer. I can confirm what he has already said as to the impurity of the water.

Cross-examined by Mr. JOHNSON: There was only a small quantity of arsenic in the water taken from the stream above the works. I believe arsenic is very extensively diffused. I have found it in the waters of the Thames. The quantity of arsenic I found in this water was not sufficient to produce ill effects on human health. I do not know that the system of filtration at Stockport has been changed. I have not seen the works there.

James Simpson, Esq., C.E., examined by Mr. CRIPPS.

I have had great experience in the construction of public works, and water-works in particular. I was engineer to the Manchester and Salford Water-Works for about ten years. The supply was then obtained by pumping from the stream. About 1846, a well was sunk in the red sandstone, which yielded at first 1 million gallons of water a day; but, after the pumping had been continued for some time, the supply fell off. The longer you pump from the red sandstone, the harder the water gets. In 1846, the Manchester and Salford Corporations had a project for obtaining a supply of water from Lyme Park. I was engineer at that time. They ultimately obtained a supply elsewhere, and that plan was not carried out. In 1854, there was a scheme proposed to supply Stockport with water from Lyme Park, but it dropped on account of the unfavourable state of the money market. In the autumn of last year, I was again applied to with reference to the supply of water to Stockport from that spot. I know the state of the Mersey at Stockport. I do not think the water from that stream can by any process of filtration ever be fit for the use of the inhabitants. I proposed to construct three reservoirs at Lyme Park, then to lay pipes from the filtering-beds to Hazel Grove, and afterwards to a service-reservoir, and so continue the pipes through the town and supply Stockport and the surrounding district. Our service-reservoir would be about 30 feet above the level of the town. We intend to make an arrangement in the pipes so as to throw a greater pressure on in case of need—in fact, we can do anything of that sort. The pipes go through the town by the principal streets. We should be able to supply Hazel Grove. The area of the gathering-ground at Lyme Park is 1660 acres. Knowing the rainfall of the district, I should think that would be sufficient. In order to ascertain the rainfall, I went to the gauges kept by the canal company; but, not finding them satisfactory, I took my own view of the case, and I found the rainfall to be about 30 inches. I allow 12 inches for evaporation. Lyme Park is in a high situation, and the rainfall would be considerable. The neighbourhood is very favourable for a scheme of this kind. The estimate I have made is £80,000, and £20,000 for distribution. I have recently examined the Manchester and Salford Corporation Water-Works, from which there is an opinion that Stockport should be supplied. In the early part of last month, I found the water in the upper reservoir much below the usual level, and in the lower reservoir 12 feet 6 inches below the usual level. The state of the middle reservoir was such, that it was impossible that water could be retained in it. That reservoir has been getting bad for years. It is more like the ruin of a work than a reservoir. Those reservoirs are not in a state to be depended on for the supply of Stockport. I am certain the Manchester people can scarcely get enough water for themselves. From my experience of the wells of that district, I do not think it would be possible to supply Stockport from them. The well-water is very hard. If a deep well were sunk, it would very probably have the effect of draining the wells which now exist. I know the Green Lane well, at Liverpool. I designed the work, and carried it out. It supplies a very great quantity of water—as much as 2½ million gallons per day. It is, in fact, two wells. I think Lyme Park the very best district from which water could be supplied to Stockport. There is no other district which possesses the same advantages as that.

Cross-examined by Mr. JOHNSON: I originally sank the Green Lane well. I left it when it was supplying 1¼ million gallons a day. I gave up the works in 1851. It was after that that it was sunk so much deeper, in order to obtain an additional supply. I made the Galton well, which has yielded a million gallons a day for three successive days. I have not examined many of the wells now in existence at Stockport. I have tasted the water The only objection to it is, that in some instances it is hard. I have no knowledge of the yield of any of the wells now in Stockport. I should very much doubt that there is one yielding 3 million gallons a day. I have no knowledge of the analysis of the water, except from what I have heard. I know it, as a general principle, that the sinking of a deep well in the red sandstone strata affects other wells in the vicinity. If the millowners along the stream should put in force their legal rights, the Manchester corporation would not be able to get enough water. I have never negotiated with the millowners on this subject. My recommendation was, that they should be compensated in money. I do not know whether that has been adopted. I found the water in the Manchester reservoirs much below the high-water mark. I should expect to find the water in any reservoir, at this time of the year, 3 or 4 feet below the usual level, but not 12 feet. I do not know what quantity of water those reservoirs will hold. My original estimate was £80,000; I now estimate for £25,000 borrowing powers. I take credit for 1667 acres of gathering-ground, 300 acres of which are due to the diversion of one of the streams. I allow 20 gallons of water per head per day. The population is about 60,000. The service-reservoir is above the level of the town; it is 20 feet above the reservoir of the present company. We should get a very good pressure. Our mains are 24-inch mains. We could very much increase the pressure in cases of emergency.

Re-examined by Mr. CRIPPS: The capital has been increased £20,000, in order to provide money compensation for the millowners.

WEDNESDAY, JULY 10.

Mr. *James Simpson* recalled, and examined by Mr. CRIPPS.

The aggregate quantity of storeage power is 219 million gallons. Taking the population at 80,000, that would be sufficient water for 214 days. The total land required for the reservoirs is 50 acres. We propose to pay a rent-charge for the land. We reckon that as a portion of the expenses.

Mr. *Spencer* recalled, and examined by Mr. CRIPPS.

Having consulted my notes, I find the degrees of hardness of the water sent to me by Mr. Sykes were, in one case, 15°, and, in the other, 18°. I have repeated the experiment this morning, and it gives a result of 1° less; but I am satisfied that, by the evening, when the test has stood for some time, it will be a degree harder. I did not know that the water came from Stockport.

By Mr. JOHNSON: I had those samples sent on the 21st of June. The patent I spoke of yesterday is for the purpose of purifying water from organic matters, iron, chalk, and all noxious gases. It softens chalk-water. It softens New River water from 14° of hardness to 8°. Magnesia is always present in well-water, but more especially in sandstone-water. By Dr. Clarke's process, the water from No. 1 spring softens 2°. After undergoing a lime process, it is reduced from 15° to 13°. That is the normal water of the district. No. 2 was reduced to 6½°. On a large scale, it would not be reduced lower than 8°. I have never found the laboratory experiments, and experiments made on a large scale with lime, agree in their results. I invented a process at Stockport for getting the iron out of the water. We now get the iron and chalk out, but the sulphates are left in. When a new well is sunk, the water then in the soil has first to be exhausted. That is generally very soft, but, as soon as that is exhausted—and, sometimes, that takes some months—the water becomes very hard. The water at the Green Lane well was at first 5° of hardness, and now it is 13°. The red sandstone water abounds in sulphates, which make the water very hard.

Mr. *T. Statter*, C.E., examined by Mr. CRIPPS.

I am agent to the Earl of Derby. I have examined the Manchester reservoirs. One was empty, and the others were very low. I can confirm what Mr. Simpson has said of them. I know Stockport very well. There is no other spot near, which would be so well adapted for supplying Stockport with water as Lyme Park. It is very clean water, and in a position which no amount of population is likely to reach. I know Mr. Leigh, the owner. He has considerable property in Cheshire and Lancashire.

Mr. *James Glaisher*, examined by Mr. CRIPPS.

I am a fellow of the Royal Society, and secretary to the British Meteorological Society. I am superintendent of the meteorological department of the Greenwich Observatory. I have turned my attention to the rainfalls in different parts of the country. In the district of Stockport, the rainfall would be, in the driest year, 31 or 32 inches, and, on the average, 42 or 43 inches. I reckon 9 or 10 inches for evaporation. I have examined the rain-gauges kept in this district. They were not reliable.

Cross-examined by Serjeant WHEELER: The Markwell Top Knot gauge could be depended on. The average rainfall at Lyme Park is 42 or 43 inches. The average fall in the three driest years was 33 or 34 inches. The rate of evaporation depends on the temperature of the air, and also on the nature of the receiving surface.

Thomas Hawksley, Esq., C.E., examined by Mr. CRIPPS.

I constructed the Liverpool Water-Works. I am acquainted with the neighbourhood of Manchester and Stockport. I have examined the rainfalls there. I am well acquainted with Lyme Park. I travelled in the district a great deal in 1845, and have known it ever since. I consider it is well adapted for the supply of Stockport with water. I know the Manchester Water-Works. The supply of water there has been gradually decreasing for many years. It has been declining ever since the water was introduced. Stockport contains about 60,000 inhabitants. The average amount of water required there would be 16 gallons per head per diem. The storeage-reservoirs, I think, are ample for that supply. A better supply could be obtained in Lyme Park than in many other places during dry weather. The quality of the water of the Goyt is worse in dry weather than in other parts of the year. Filtration will not render water chemically impure fit for domestic use. Very little of the impurity is solvent matter. I do not think the water of the Goyt could be rendered fit for domestic consumption. I know Dr. Clarke's process for softening water. It decomposes the bodies held in solution. Chemical processes are not eligible to be used on a large scale in the supply of large towns. I do not know any large town where Dr. Clarke's process is used. It is not used at Stockport. It was tried at some small works at Plumstead. That being soft water, containing carbonate of lime, it would reduce it from 16° of hardness to 8°. Dr. Clarke's process is applicable for the laboratory, but not to be used on a large scale. I do not think it applicable in the case of water rendered impure by things thrown into it from manufactories. I am acquainted with the red sandstone formation. I do not give preference to the water obtained from that source. The quality is variable, and it is generally very hard. In Liverpool, the hardness varies very much. In the Green Lane well, the water was originally only 5° of hardness, but now it is 13° or 14°. That well supplies the largest quantity of water in the neighbourhood. By pumping that well, we have drained wells at a distance of four miles. There is a great difference in the hardness of the water from the different wells in Liverpool, all of which are within a radius of four miles. I do not think Stockport is well situated for a good supply of water from the red sandstone. They used to get water at Stock-

port from the red sandstone formation. Lyme Park has been regarded by the others as the proper source for the supply of Stockport. There could be enough water provided for 100,000 people. The site forms part of the rain-basin of the district. Manchester, in my opinion, cannot spare any water to Stockport, even if it had the legal power to do so. I have been consulted by the corporation of Salford as to the best means of improving the present supply. I recommended that new reservoirs and new works should be made, so as to be able to pump the water higher.

Cross-examined by Mr. JOHNSON: I am now the engineer to the Salford Water-Works. I laid down some of the pipes in Salford. There is a large 18-inch pipe which runs through the town; the diameters of the distributing-pipes vary to a very great extent. Many of the pipes have been laid in Salford during the last ten years. I do not know whether they are of the same relative size as those laid before. The demand for the supply in Salford has gradually increased, but not largely. The water at Salford is not paid for according to the quantity supplied. I am the engineer of the Nottingham Water-Works. They have two sources of supply there. They do not depend exclusively on the Trent for their supply. I do not know the degree of hardness of the water of the Trent, nor the quantity of solid matter contained in it. I do not know that Dr. Miller has analyzed, and found it to be 20° hardness; but you may depend on what he says. The time required for Dr. Clarke's operation varies very considerably; with chalk-water it would take from six to eight hours. I do not know that it has been applied for six years at Castle Howard. No one can predict what the supply of water would be from the red sandstone. I attach most weight to the question of quality. I doubt whether any artificial means of purification will ever be applicable to water for the supply of a large town. I think there will be a competent supply of water from Lyme Park. We do not calculate for any compensation. My opinion as to the rainfall is based on the fall at Manchester, and in the immediate neighbourhood. I rejected the rain-gauges, because of their position. What some people call impurity in water is only dissolved salt. The water of the Serpentine is complained of solely on account of the matters held in solution. There is no better system of filtration, for ordinary use, than sand; but there are other methods, such as Mr. Spencer's, for decolourizing the water. There is a small quantity of iron in the water at Lyme Park.

Re-examined by Sir W. ALEXANDER: When the bargain was made between the Manchester and Salford corporations, the probable increase of population, and consequent increased demand for water, were taken into consideration. Chalk does not abound in the red sandstone water. Carbonates of lime and magnesia are to be found in it. Dr. Clarke's process will not act on them. We have not provided for any compensation to be given to Colonel Davenport and the millowners. There are some very large water-sheds in the neighbourhood, which will supply the brooks.

By the CHAIRMAN: The Manchester corporation wish to increase their source of supply, in anticipation of a probable increased demand. They are obliged to stop the high-pressure supply to Salford at certain parts of the day. I do not think Manchester can afford any supply to Stockport. I have well considered that matter, and I consider it most inexpedient that Manchester should supply Stockport. I do not know whether Clarke's process is still used at Plumstead. I have never heard of that process being applied in a large town.

Mr. *S. Heelis*, examined by Mr. CRIPPS.

I am a solicitor, residing in Manchester. I have been mayor of Salford. There are three Acts of Parliament empowering Manchester to supply water; they were passed in 1847, 1849, and 1854. The places to be supplied by the Act of 1847 are mentioned in the preamble of that Act.

Mr. *John Aird*, examined by Mr. CRIPPS.

I am a contractor. I have seen the plans for the proposed works. I prepared my estimates according to the plans, and sent in a tender for £45,958. 14s. I have made a tender for pipe-laying, and other works which would be incidental to laying the mains.

Cross-examined by Mr. WEBSTER: The cost of distribution-pipes would be a very considerable amount. My tender does not include compensation to the millowners or the land. It is only for works.

Mr. *Cochrane*, examined by Mr. CRIPPS.

I have iron-works at Dudley. I have contracted to supply 6400 yards of 24-inch pipes, 5500 of 15, and 700 of 12, for £17,887. 10s. I also put in a tender, for 55,000 yards of distributing pipes, averaging 5 inches in diameter, of £14,566. 13s. 4d.

Cross-examined by Mr. JOHNSON: That is for the pipes only. This would be in addition to Mr. Aird's contract.

Mr. JOHNSON then addressed the committee on behalf of the old company for the supply of Stockport with water. He contended that the evidence of the witnesses who had been called had failed to prove the preamble of the bill. He considered that nothing could be more harsh than driving those who were connected with the present company from their works; which would certainly be done if the present bill were passed, for it was beyond the most sanguine expectations to suppose that the two companies could coexist. They had spent large sums of money on their undertaking; they had increased their works as the population of the town required, and no less than about 30,000 additional persons had been supplied since the year 1851; they had done all they could to improve the quality of the water which they supplied; and yet, for their benevolent undertaking, as he might call it, they had had no adequate return. He would be able to prove that large sums had been expended, not for the purpose of enabling the shareholders to feather their own nests, but for the purpose of affording, to the best of their ability, a good and sufficient supply of water to Stockport. They had never realized above 4½ per cent; but they hoped that, having done their duty, they would, hereafter, get a better return for their outlay. If, however, the new company was allowed to come in, all idea of a return would be gone for ever, their undertaking would be torn from them, and their whole property scattered to the winds. Having sketched the history and operations of the company, the learned counsel went on to state what means the present company possessed for increasing their supply. He referred at some length to the Acts of the Manchester corporation, and contended that the corporation had the legal power, and were, in fact, under an agreement to supply the borough of Stockport with a certain quantity of water per diem. He would also be able to show that there was no physical difficulty in the way of such being done, and that the Manchester water was of the purest character. He had a chemical analysis of that water, which stated that its solid contents were 5·20 grains; mineral matters, 4·72; organic matters, 0·48; and that it was of only 2 degrees of hardness. In addition to the supply which could be obtained from Manchester, he would be able to prove that the formation of Stockport itself was one particularly adapted for yielding a good supply of water. The learned counsel then referred to the promoters of the present bill, and contended that they were nearly all persons who resided in different parts of the country, and who had no interest whatever in the town of Stockport; and, under all the circumstances of the case, he entreated their lordships to throw out the preamble of the bill.

THURSDAY, JULY 11.

Mr. *Mather*, examined by Mr. WEBSTER.

I am the secretary and manager of the Stockport Water-Works Company. I was previously in the service of Mr. Marsland. The water-rights were purchased by Mr. Marsland's grandfather, for £2000. The present Messrs. Marsland are large proprietors in the present company. There is an annual payment of £500, in addition to the £2000. An Act of Parliament was obtained for the company. There have been weirs constructed in the Mersey, and other works for pounding the water. The water is obtained from the Mersey by works constructed by Mr. Marsland. Up till 1850, the works were carried on by the present Messrs. Marsland. After that time, arrangements were made with other persons to form the company which now exists. They were gentlemen of the town and neighbourhood. Additional steps were then taken for improving the supply of water to the town. There are two weirs on the Mersey. There is a pounding reservoir at Nab's Pool. The water is conveyed to filtering-reservoirs at a place called Wood Bank, at a considerable elevation above the town. The number of parties taking water has gone on increasing gradually. The increase during the last eleven years, in the number of houses supplied, has been 5728. The average increase in the number of persons supplied, is 27,000. In 1847, there were 12,962 dwelling-houses and cellars in the town. The rental of the water company at the present time is £5300. There are now about 9000 dwelling-houses supplied. There has never been any deficiency in the supply of water; there have been no complaints made on that subject. We are in a position to supply a much larger population. We have five drinking fountains, which are supplied gratis. There has been no complaint of the quality of the water supplied to those fountains. Previous to 1850, the inhabitants were supplied both by wells and by the river. For drinking purposes the spring-water is preferred, but for general purposes the river-water. About 1857, the attention of the company was called to the fact of the water not being so good as formerly. There had been an increase in the number of manufactories on the side of the river. I was told to make a report on the subject. I made an inspection of the river, and reported that parties were throwing dirty water into the stream. I then had a communication with the solicitor of the company. Some of the water was sent to Manchester to be analyzed. Notices were given, and legal proceedings taken against the parties shortly after that—some time in 1858. There was a combination on the part of the millowners to resist the proceedings. Taking these steps occupied considerable time. We waited to see if the notices we had given would take any effect; finding they did not, we applied to Mr. Rolt in March, 1859, and he recommended us to file a bill in Chancery. Three bills were filed in May, 1859, against Messrs. Potter, Turner, and Welsh. There was considerable delay on the part of the other side in their proceedings. There was no delay on the part of the company. The result of the proceedings in Chancery was an action at law which was tried at Chester, and at which we obtained the verdict. There was an injunction issued against Messrs. Turner. In the course of the proceedings, the company was advised to get a supply of water from Manchester, and certain agreements were entered into with the Manchester corporation. The Act of 1854, contained powers for entering into these agreements. The agreement was made in 1859. The resolution to obtain water from another source was come to in December, 1858. In April, 1860, we applied for tenders for pipes to bring the water from Manchester to Stockport. We had not heard of the notice of this bill at that time. We only heard of it last November; there was no name attached to it, and we did not know who the promoters were. I received tenders for the supply of pipes on the 14th of April, 1860. The size recommended was 12-inch mains to bring the water from Denton, but not for distribution in the town. We were told that the application to Manchester might affect the pending legal proceedings, and nothing more was done in the matter on that account. In January, 1861, the subject was again taken up, and on the 16th a resolution of the directors in favour of it was passed. [The resolution was read.] We received another tender on the 16th of January, 1861. We had no complaints previously to this time, except such as all water companies are liable to. The company have had eighteen or nineteen miles of new pipes laid down since 1850. There is always an accumulation in the pipes at the end of a main, or where there is a change in the pipes from a larger to a smaller size. The water said to be sold from the Hampshire brook is the same water which has been given up by a brewery in the neighbourhood for our water. The capital of the company, on the 1st of January, 1860, was about £66,000, of which £20,000 was borrowed at an average of 4¾ per cent.; the revenue was about £5300. That was the largest revenue the company has ever received. The expenses for management and interest were about £2200, which would leave a net revenue of £3100. We have not paid a dividend during the last half year, and we are not in a position to do so now, on account of the legal proceedings which we have taken. The shareholders have never received more than 5 per cent. The total number of shareholders is about twenty-five. A considerable sum of money was spent on the works by Messrs. Marsland, before the present company existed. It will be impossible for the new and the old company to exist together. We now supply about five-sixths of the population. There is nothing to prevent the company from supplying water from the sandstone strata; we have supplied some this year. There is no difficulty in obtaining water from Manchester. The notice to the Manchester corporation to fulfil their agreement was supplied on the 25th of June this year. There would be a large supply of water, I should think, from the sandstone strata.

Cross-examined by Sir W. ALEXANDER: Other property was purchased by Mr. Marsland for the £2000, beside the water rights. The payment was made to Sir George Warren, the lord of the manor. The annual payments are also paid to his representatives. The company has no special Act. Mr. Bateman, the engineer to the company, was a large shareholder, but is not so now. I am not a shareholder. The inspector of nuisances in Stockport has never made any complaint as to the quality of the water. At the trial at Chester, I heard one of our turncocks say that the water had been bad for some time, and that he had heard complaints, and that there was a settlement at the bottom if the water was allowed to stand. I heard Mr. Collier, our counsel at that trial, say that there was enough arsenic in the reservoirs to poison the whole of the inhabitants. I was examined at the trial; and I stated that the water grew redder and redder as we went up the stream, and that in one part it looked as if they had been slaughtering cattle in it. I said that I first observed the discolouration in 1857. No practical results have yet followed the action against Mr. Welsh. The time allowed him to make certain works will not expire till the end of this month. An extraordinary meeting of the shareholders to consider the subject of the supply of water from Manchester, was held in May, 1861, since the preamble of the bill now before the House had been passed by the House of Commons. There

were nine shareholders present at that meeting. Messrs. Marsland were there; they do not hold a half of the shares of the company. The cost of the water to be supplied from Manchester—namely, 1 million gallons per day, at 2½d per 1000 gallons, would be £3421 a year. The £20,000 we have borrowed is lent us by Mr. Thomas Ashton, who has lent £6000; Mr. Jeremiah Clay, £4000; Mr. Turner, £5000; and Mr. Robert Worthington, a trustee, £5000. She shares of the company are £10 each. We have supplied water from the red sandstone strata this year, without its being subjected to Dr. Clarke's process of filtration. I have made a calculation as to the cost of the pipes which we shall require for the supply of water from Manchester; they will cost from £7000 to £8000. We have no power to compel the shareholders to pay any further amount. We have the power to lay down the pipes.

Re-examined by Mr. WEBSTER: The parishes of Stockport and Redditch join; and the Manchester corporation have works laid to the latter place.

By the COMMITTEE: The shareholders were told at the extraordinary meeting that they would be required to provide £7000 or £8000 for laying down pipes. They did not give their consent, but thought they had better ascertain if the Manchester corporation would lay them. A proposal was made to the corporation of Manchester, which they have not accepted. No other meeting of shareholders has yet been held. We have the power to increase both the number of our shares, and the amount of our capital. The Manchester corporation are willing to lay down the pipes if we will pay 6½ per cent. for the cost incurred. All the shareholders are quite willing to pay interest on the money which will have to be borrowed for laying down the mains.

The room was then cleared, and, on its being reopened,

The CHAIRMAN said it was quite clear that a better supply of water must be obtained from some source or other, and it appeared, from the evidence of the last witness, that there would be some difficulty in getting that supply from Manchester. The committee were very anxious not only to obtain the better supply of water, but also to protect as much as possible the interests of the old company; and they, therefore, thought that it would be much better for both parties if they could come to some arrangement between themselves.

Mr. JOHNSON said he was much obliged to his lordship for the suggestion which he had thrown out; and, if the committee would adjourn till Monday, they would do their utmost to come to an agreement.

Sir W. ALEXANDER expressed his consent to this course being adopted.

MONDAY, JULY 15.

Sir W. ALEXANDER said that, after the adjournment of the committee at their last sitting, the agents of the promoters wrote to the solicitors of the opponents of the bill, stating the new company were willing to become the purchasers of the rights and powers of the Stockport Water-Works Company in consideration of a perpetual annual rent charge of 3 per cent. on the existing share capital, such annual rent charge to be paid half yearly, and to be secured on the income of the company in priority to any other claims; and they offered to take upon themselves the debenture debt of £20,000, now secured on the undertaking of the Stockport Company. The reply was, that the old company could not accept that proposal which they said was based on an assumption of facts which had not yet been proved, and on an entire misapprehension of the true position of the Stockport Company, not only with reference to their financial position, but also with regard to their capabilities for supplying Stockport with water quite as good in every respect as that of Lyme Park. They agreed, however, to withdraw their opposition, provided that clauses were inserted in the bill to the effect that the promoters should not be allowed to commence their works until January, 1863, in order to give the old company an opportunity of supplying their own district with water as good in every respect as the water from Lyme Park. The supply to be decided by an engineer appointed by the Board of Trade.

The CHAIRMAN said he thought the proposition a very strange one, and one which the committee could not for a moment entertain, and the bill must therefore be proceeded with.

TUESDAY, JULY 16.

J. F. Bateman, Esq., C.E., F.R.S., examined by Mr. JOHNSON.

In 1849, I was consulted with regard to the forming of a joint-stock company in Stockport for the purpose of supplying water. The town, at that time, was partly supplied from the river Goyt, and partly from the red sandstone. The river-water was then in a very good condition. I recommended that the water should be entirely supplied from the river, on account of its softness. The number of water tenants at that time, was 4000. In 1851, the joint-stock company was formed, and part of the works were carried out. New filters were shortly afterwards brought into operation. At the end of 1852, we supplied 3000 additional persons. The supply has gradually increased, and now we supply 9600 houses, representing about 50,000 inhabitants. The present rental is £5300. The rental has been gradually increasing since 1852. In 1854 and 1855, there was a proposal to supply water from Lyme Park. No bill was proceeded with. I attempted to show that the scheme would not be of much good. The river-water had become worse than it was in 1849. The hardness was under 4°, and the organic matters 2 grains. The water from the river, at that time, was better than the Lyme Park water. The Elmhurst Brook water contained 3·16 grains of organic matter, and 4·5 degrees of hardness. In 1857, the water was analyzed, and the hardness had increased from 4° to 6°. Proceedings against the parties polluting the stream were taken, under legal advice, soon after this time. In 1859, the agreement was entered into with the Manchester corporation for a supply of water. That agreement secured to Stockport 1 million gallons out of the 5 millions which the Manchester corporation took from the river. Notice has been given to the Manchester corporation with reference to that agreement. In 1860, there was a resolution passed by the board to apply to Manchester. That was not acted upon, because it was not known what effect it would have on the then pending legal proceedings. During those proceedings, every precaution was taken for the purpose of purifying the water. The water now delivered is better than in 1854 and 1855. It is purer, and not so hard. The water in the stream would not be a fair sample of the water as supplied to the town. In 1860, I recommended that a well should be sunk in the red sandstone. I recommended that that scheme should be adopted, because it would be the cheapest way in which to get a supply of water. That well has not been sunk. I am acquainted with the geological character of the district. A good and abundant supply of water could be obtained from the red sandstone strata. I have known Mr. Sykes's well, near Stockport, for twenty years; it supplies nearly 500,000 gallons daily. The water can be reduced to a less degree of hardness than the Lyme Park water. The progressive increase in the revenue of the company has been £200 a year. I have no doubt that increase will go on. If a new source is obtained, I think the increase will be much more. The company are fully authorized to adopt a new source of supply. To some extent, the large trade consumers are supplied by meter. If they were all so supplied, it would increase the revenue of the company. I would rely on a gross annual income of £5700, and a surplus of £3500 a year. The quantity of water at present supplied is from 500,000 to 700,000 gallons a day. There is a well at Park Mills belonging to Mr. Marsland, yielding a large quantity of water, which we are entitled to use. The actual consumption is 13 or 14 gallons per head per day. We should be able to supply any extra amount required by increase of population, &c. A well has been sunk near Manchester, which yields 5 million gallons per day. We should require 500,000 gallons from Manchester, which, at 2½d. per 1000 feet, would amount to an annual rent-charge of £1720. The cost of bringing the water from Manchester would be £7000. I should not have the least objection to embark in the undertaking myself. We can get any quantity of water from Manchester not exceeding 1 million gallons. Mixing the Manchester water with the sandstone water would not reduce the hardness of the latter water. The cost of filtration and sinking more wells would be about £3000, and that, added to the cost of pipes to bring the Manchester water, would be £10,000. That would give us a capital of £57,000. The company would be able to pay 6 per cent. That is assuming the whole of the water to be taken from the red sandstone. The cost of softening the water would be about the same as the cost of filtration. Before the promoters of the Lyme Park scheme can supply the town, they must spend over £100,000. We could supply water from Manchester and the Park Mills well in six months. There is nothing unusual in limiting the operations of bills to a certain time. The operations of the Manchester corporation were suspended for three years. The new company would not be able to supply water in less than three years. Manchester is at present able to supply 14 million gallons a day. When Mr. Simpson was there, which was after a long drought, we had twenty-one weeks store of water. We have a constant record kept of the quantity of water in the reservoirs. The day Mr. Simpson was at the works, there were 13 million gallons of water in the reservoirs. The Manchester corporation could distribute at least 2 million gallons a day to any other town. As the engineer of the Manchester corporation, I should not be afraid to supply Stockport with water. There have been no complaints from Salford with reference to the quantity of water supplied to them. If there should be a deficiency there, it would not arise from an insufficient quantity at Manchester. The difference between the levels of the reservoirs of the old and new companies is five or six feet. The new company's reservoir is the highest. I am the engineer to the Wolverhampton Water Company. There is an Artesian well there which supplies 200,000 gallons a day. The actual quantity of acres in the gathering-ground of the Lyme Park scheme is 1590, 303 of which only yield a partial supply. The average rainfall on that ground, according to a gauge kept almost on the ground itself, is 32 or 33 inches, and the utmost that can be reckoned on in dry seasons is 15 inches. A million and a half gallons per day is the utmost that can be relied upon. The population included in the limits of the present bill is nearly 80,000. I would not have the Lyme Park scheme at any price whatever, even so far as the quantity of the supply is concerned. Mr. Simpson's estimate for the works and compensation, is £100,000, and with other expenses it would make £110,000. To pay 5 per cent, that would require an income of £5500 a year. The expenses added to that would make it necessary that they should make £8000 a year. The present rent-charge is only £5300. I do not think the scheme will answer in a commercial point of view. The cost of raising water from the new red sandstone would be a halfpenny per 1000 gallons. I believe the two companies can exist together.

Cross-examined by Mr. RODWELL: In 1860, the Manchester corporation applied for fresh capital. They had then spent a larger sum of money than I originally estimated. The expense in increase of the estimate has been £150,000 or £200,000. The quantity of water supplied has been less than that originally estimated. The Manchester works were perhaps the most difficult ever constructed. I have assumed there is legal power in Manchester to give, and in Stockport to take the water. Stockport is not within the limits of the Manchester Act, but Redditch is. I came to the conclusion that Lyme Park was not a proper place for the supply of water some time ago. In the spring of 1860, I stated that if the river supply was abandoned, the next available place was Lyme Park, as an adjunct to other supplies. As an entire source of supply, I do not think it is suitable. Six months will enable us to supply good water to Stockport. We have not done that hitherto, on account of the legal proceedings which were being taken. The directors of the company determined to obtain a better supply in January, 1860. We have only avowed this since this committee has been sitting. We had no occasion to avow it at Stockport. I think the water from the river might be made good, but there is a prejudice in the town against it, and I think the directors ought to meet that prejudice. I consider the safe rainfall to be only 25 or 26 inches. I stated last year that the rainfall in the Manchester district was 47 inches. The two districts are a considerable distance from each other, and are under different circumstances. I know Dr. Clarke's system of softening water. I do not know that it tends to fur the pipes. I believe that process can be carried on, on a large scale. The Manchester storeage is 3,200,000,000 gallons: 120 days store is sufficient. The compensation we give to millowners is 55 feet per second.

Re-examined by Mr. JOHNSON: The Manchester works were of the most difficult kind, owing to the irregular nature of the ground, land-slips, &c. One of the reservoirs is two miles long. There is no danger to be apprehended from the reservoirs. We have abundant means for supplying Stockport, as well as Manchester. The charcoal filtration was adopted in 1859. The water is first filtered through sand, and then through charcoal. The judgment of the Court of Exchequer was given since this bill has been before the House. I have seen Dr. Clarke's process carried on, on a large scale, at some works in Manchester. The water from Park Mills would not require softening. Red sandstone water varies in its degree of hardness. Fifty-five cubic feet of water per second, as compensation to the millowners, is sent down regularly.

Mr. *S. C. Homersham*, examined Mr. WEBSTER.

I am a civil engineer. I have had a great deal of experience in connexion with water-works. I am well acquainted with Stockport, and have been so since 1846. My attention has been specially directed, at various times, to the water supply. The town stands on the new red sandstone formation, which extends to Liverpool. It is a peculiar absorbent of rain. The formation is of very considerable thickness—from 600 to 900 feet. I believe, it is well adapted to supply Stockport with water of a very superior quality, and an unlimited supply could be obtained. I have had more experience in softening water than any other person. I had works which were supplied with 600,000 gallons a day under my control for some time, and I was able to observe the softening process. The present water could be reduced to about 5° of hardness. The old company could supply water from the red sandstone at a very cheap rate. I should think, £45,000 would enable them to supply almost a million gallons a day. There are several wells sunk in the red sandstone formation, and they yield a large amount of water. The water from this strata is of an uniform temperature; it is very much approved of

generally for drinking and domestic purposes. The Lyme Park water, even when filtered, would contain animalculæ and organic matters. The gathering-ground of the district is the same as stated by Mr. Bateman. That would give 1½ million gallons of water per day. The quality of the red sandstone water is superior, in every respect, to the Lyme Park water. The cost of the new scheme would be very much more than that of obtaining water from the sandstone. The softening process succeeds very well. It produces no ill effects on the pipes. It does not produce a particle of fur. The inhabitants of London have requested that they should be supplied with softened water. There is no practical difficulty in softening water to 5° or 6° of hardness. It is a cheap process.

Cross-examined by Mr. RODWELL: I was engineer to the Plumstead Water-Works six or seven years. I examined the pipes myself. I do not know whether the process has been discontinued. The works have lately passed into other hands. I have examined the pipes at a distance from the reservoir. [A pipe, which had been taken from the Plumstead Water-Works, the inside of which was covered with a kind of fur, was then produced, and the attention of the witness called to it. The witness stated that the substance in the pipes was not fur, but something which had got there from carelessness while using Clarke's process.] Pumping the water from the red sandstone would have no effect on the neighbouring pumps. I do not know that the sinking of a well at Liverpool drained the other wells.

Re-examined by Mr. WEBSTER: There is an abundance of water in the district. The deposit in the pipe produced has got there by carelessness.

Dugald Campbell, Esq., F.C.S., examined by Mr. JOHNSON.

I am analytical chemist at Brompton Hospital. I have paid much attention to the supply of water to towns. I have analyzed the water which is supplied to Stockport. It contained 11½ grains of solid contents per gallon, consisting of 10½ grains of mineral matter and 1½ of organic. The hardness was 6½°. It is much better water than we are drinking in London. There is nothing to make it objectionable for domestic use. There are not ten towns in Great Britain where there is a better supply. I have examined the water at Lyme Park. In 1855, the water at Elmhurst Brook contained more organic matter than I have found in it recently. It still contains a large quantity of oxide of iron, which makes it objectionable in many respects, especially in making tea. One sample, taken at the site of the proposed reservoir, contained 8·56 grains of solid contents, consisting of 7·04 grains of mineral matter, and 1·52 of organic mater. The hardness was 5·78.° The next sample, taken from the site of the proposed lower reservoir, contained 9·60 grains per gallon of solid contents, consisting of 8·48 grains of mineral matter, and 1·12 grains of organic matter. The hardness was 6·32°. When softened, the first sample went down to 4·7° of hardness, and the second one to 5·39°. I should not soften water of 10° or 12° of hardness. Clarke's process can reduce water from 18° and 20° to 2½° of hardness. It is capable of being applied on a large scale. I do not think there can be any furring of the pipes by that process. None of the deposit can find its way into the pipes. I have examined the red sandstone water. The solid contents per gallon were 19·52 grains; consisting of 18·56 grains of mineral matter, and 0·96 of organic matter. The hardness was 7·65°. When softened, the solid contents were upwards of 11 grains. The hardness was 5°. The water from Mr. Sykes's well contained 21·61 grains of solid matter. The hardness was 10°; I softened it to 5·1°. That water I could recommend for general use. It does not require to be softened. I have analyzed the Manchester water. It does not vary in quality. The solid contents were 5·20 grains per gallon; consisting of 4·78 grains of mineral matter, and the rest organic matter. The degrees of hardness were 2. It is almost the purest water that can be found. Arsenic is to be found in almost all the pure streams in the kingdom.

Cross-examined by Mr. RODWELL: Lyme Park water in some respects is no better than the water at present supplied to Stockport. I was at the trial at Chester, but was not examined. The material which has been produced as coming from the pipe appears to be a deposit of chalk and oxide of iron. It is most likely produced by the process of softening.

This having closed the case of the opposition, Sir W. Alexander was about to reply on the whole case, when the room was cleared. On the counsel and parties being admitted,

The CHAIRMAN said: The committee have decided that the bill must be proceeded with, and that clauses shall be inserted enabling the existing company, three months after the passing of the Act, to call upon the new company to take up their works in accordance with the proposals contained in the letter of the 11th of July, 1861. If the old company do not desire these clauses, of course there will be no necessity to insert them.

Mr. WYATT said that he was instructed by the opponents of the bill to say that those clauses would be of no benefit to them, and, therefore, they should not require them.

Legal Intelligence.

TUESDAY, AUGUST 6.

(*Before the* LORDS JUSTICES.)

HILLS *v.* EVANS.

On the 4th of March last, this case was heard for some hours on a motion to dissolve an injunction which had been granted by Vice-Chancellor Wood on the 21st of February, and reported in this JOURNAL on February 26th, by which his honour declared that the process in use by the defendants, the London Gaslight Company, and the purification of gas by the material described in Mr. Frederick John Evans's letters patent, were an infringement of the patent of Mr. Frank Clark Hills, the plaintiff; and the plaintiff undertaking to abide by any order of the court as to damages, it awarded an injunction restraining the defendant from the manufacture, and purifying of gas according to, or in imitation of, the patent of the plaintiff, and for other purposes. On that occasion their lordships interposed, and the following order was agreed to—"The plaintiff to serve a notice of motion for a decree forthwith, and the defendants to have six weeks before the injunction commences, and the plaintiff to give an undertaking to be answerable in damages as from the expiration of that period." The case now came on for hearing, and upon the motion for dissolving the injunction. The substantial question involved, is whether the use of oxidized iron borings for the purification of gas is an infringement of the plaintiff's patent for the use of hydrated peroxide of iron for that purpose?

This case was argued for several days during the last sittings, and it came before the court as an appeal motion, and also upon original motion to hear the cause.

The substantial question involved is, whether the defendant is infringing the plaintiff's patent?

Mr. ROLT, Q.C., Mr. GROVE, Q.C., of the common law bar, and Mr. MARTEN, appeared for the plaintiff; Sir HUGH CAIRNS, Q.C., the Hon. GEORGE DENMAN, Q.C., and Mr. DRUCE, appeared for the defendant.

JUDGMENT.

Lord Justice KNIGHT BRUCE: This case came before us upon a motion by way of appeal from an interlocutory order made by one of the learned Vice-Chancellors, and also originally for a hearing of the cause. With respect to the former, we are of opinion that the evidence before the Vice-Chancellor, and before us, upon it, was and is sufficient to call for his honour's order and to support it. The injunction granted was only until the hearing of the cause or further order; and the appeal motion before us must be refused without prejudice to any question, the plaintiff having given before us the usual undertaking as to damages. The costs of the appeal motion will be reserved until the hearing of the cause to be dealt with by the judge or judges who shall hear it. This excludes the notion of a hearing of the cause having taken place before us—though, in fact, it did so. That hearing, however, it is perhaps to be regretted, has been of no avail, inasmuch as, with respect to the proper decree to be made, my learned brother differs materially from me. Therefore, we can only—besides disposing, as has been said, of the appeal motion—discharge the order made or direction given by us for bringing the cause hither for hearing, and remit the suit for that purpose to the court of the Vice-Chancellor Wood, with liberty, in consequence of what took place as to evidence when that order was made or direction given for the defendant, within a time to be limited, to enter into further evidence; and, if he shall do so, then for the plaintiff also, within a time to be limited, to adduce further evidence; the costs of the ineffectual hearing before us to be costs in the cause to be dealt with at the future hearing.

Lord Justice TURNER: I agree in opinion that the order which was made by the Vice-Chancellor upon the motion was right; but, I have not been able to concur with my learned brother upon the proper decree which ought to be made in the cause. Upon its being agreed that there should be a motion for a decree, we cautioned the parties against entering into further evidence upon the validity of the patent, and it was stated at the bar by the counsel of the defendant, that in consequence of that, they had abstained from going into full evidence upon the subject. The consequence is, therefore, as it seems to me, that the right course is that the matter should go back to the Vice-Chancellor, in order that it may take the usual course of being heard before him, with liberty to the defendant to enter into further evidence, and to the plaintiff to do so too, if he shall be so advised. One is bound to exercise one's own judgment upon the subject; but, the result of the hearing before us is that it altogether fails, and it becomes necessary, therefore, to discharge any order that there may be for the motion for decree being heard before us. Discharge that order, and remit the case back again. I suppose both parties will agree that the notice of motion for the decree given before us may be treated as a motion for a decree before the Vice-Chancellor, and then extend the time for entering into further evidence. I very much regret, for the sake of the parties, that we have not been able to come to a conclusion upon it.

Mr. MARTEN: Perhaps the form will be to permit me to give notice of motion for a decree before the Vice-Chancellor, with liberty to adduce further evidence.

Mr. DRUCE: I do not understand why my friends are to adduce further evidence.

Lord Justice KNIGHT BRUCE: The motion for decree will stand as a motion for decree before the Vice-Chancellor; and the motion for the cause to be heard will be considered as not having been heard before us. The hearing will take place before the Vice-Chancellor upon the motion for the decree as it exists. Do you wish, Mr. Druce, to go into evidence?

Mr. DRUCE: As at present advised, I do not; but I would rather not bind myself to that.

Lord Justice KNIGHT BRUCE: I expected that. You, Mr. Marten, will not want to go into further evidence if Mr. Druce does not.

Mr. MARTEN: I do not wish to adduce further evidence if my friend does not.

Lord Justice KNIGHT BRUCE: Mr. Druce, what time do you wish to have for adducing further evidence if you wish it?

Mr. DRUCE: As nothing can be done during the vacation, perhaps your lordships would let us have till a week after term to consider the matter.

Lord Justice KNIGHT BRUCE: That is reasonable, I think.

Mr. DRUCE: We will give notice to the other side, within a week after term, whether we do or do not intend to adduce further evidence; and then we may apply to enlarge the time.

COURT OF QUEEN'S BENCH.

MONDAY, JUNE 10.

(*Sittings in Banco, before Lord Chief Justice* COCKBURN, *and Justices* WIGHTMAN, CROMPTON, and BLACKBURN.

THE QUEEN *v.* THE LONGTON GAS COMPANY (LIMITED) AND OTHERS.

The defendants were indicted at the Staffordshire Spring Assizes (1859), for creating a nuisance by digging trenches in the streets of the town of Longton, and at the trial the company and certain of the defendants were convicted, subject to the opinion of the court on a special case, which was argued in Hilary Term, 1860. The judgment of the court supported the conviction, and nominal fines were inflicted upon the defendants, who entered into an undertaking not to offend again by disturbing the public thoroughfares of the town for private lighting. On the 2nd of May last, Sergeant Pigott moved for and obtained a rule *nisi*, calling upon the defendants to show cause why an attachment should not issue against them for contempt in violating the undertaken so given.

Mr. M'MAHON now appeared to show cause against that rule. He said the application of his learned friend, Serjeant Pigott, was for an attachment against Mr. Joseph Knight for breach of an undertaking, which was contained in a rule of this court after judgment upon an indictment for nuisance. The judgment was pronounced in the spring of 1860, when the defendants, the Longton Gas Company (limited), were adjudged and ordered for their offences to pay a fine of 6s. 8d. to the Queen, and the other defendants mentioned in the indictment, who were servants of the company, were severally fined 1s., the company and the said Joseph Knight undertaking that neither of them would offend again by disturbing the public thoroughfares in the town of Longton for private lighting, unless the judgment of the court should be reversed. Their lordships would remember that this case was argued at considerable length by Sir Fitzroy Kelly, for the defendants, and, by Mr. Bovill, for the prosecutors, who were the Stoke Fenton and Longton Gas Company. The only reason for including Mr. Knight in the prosecution, was to raise the question whether upon the facts stated, he was liable to be indicted. The acts charged against him, and on which a verdict of guilty was entered, were that he, being the owner and occupier of a house in the town of Longton, contracted with the company to have it

lighted, and instructed their workmen to lay down service-pipes for the purpose. The question was, whether upon those facts he ought to have been convicted, and the court being of opinion that he was liable, he was therefore sentenced with the other defendants to a fine of 1s., and the undertaking referred to was given. The Longton Gas Company (limited) were indicted for two offences—viz., for disturbing the public thoroughfares for the purpose of laying down pipes for the public lighting of the town, and also for disturbing the said thoroughfares for the purpose of private lighting. In the course of the argument, it was conceded by the prosecutors that the defendants had a clear right under the local Act to disturb the thoroughfares for the former purpose, and the only question then was, as to their right to do so for the private lighting of the inhabitants of the town, and upon that point the judgment of the court was against them. It would shorten the case very much if their lordships were of opinion that they meant, by compelling the defendants, the Longton Gas Company, to enter into the undertaking referred to, that Knight was to be responsible not only for himself but for the company, and that the company were to be responsible for themselves and for Knight.

Justice BLACKBURN said that Serjeant Pigott, when he moved for the rule, did not put it on the ground that Knight was guaranteeing the company, but that Knight being a director of the company, they committed a breach of the undertaking by breaking up the streets.

Serjeant PIGOTT said he put it that each undertook for the other.

Justice BLACKBURN: I thought you put it that Knight was still a director of the company?

Serjeant PIGOTT: So he was, my lord.

Justice CROMPTON: Knight was not convicted for any acts of the company, but only because he was a proprietor.

Serjeant PIGOTT: It was meant distributively. I think Mr. Justice Crompton suggested it, and my answer was that the very language showed that each undertook for the other.

Justice CROMPTON: Knight's was a different kind of offence to that of the others.

Serjeant PIGOTT: He was a director, and a person with a private house.

Justice CROMPTON: He was not convicted *quâ* director. The object was, if I remember, to raise the question as to several different people; one as to the company doing it, and another as to the proprietors adopting their acts, and doing it also.

Justice WIGHTMAN: I was not in court when the rule was granted, but, I believe, it was suggested that Knight should be answerable only for his own acts.

Serjeant PIGOTT: He is answerable for the whole, and I suggested that when moving for the rule.

Justice CROMPTON: If I understand it, there being several parties, private persons as I may call them, indicted, and also a gentleman who happened to be a director of the company, the undertaking was taken from the company, but he could not be attached in order to enforce it.

Justice BLACKBURN: Why was he made a party to the undertaking, unless it was to give his personal security for the fulfilment by the company of their undertaking?

Serjeant PIGOTT said the indictment was against the company, and against several members of it, and also against several workmen employed by the company. Amongst these persons was Mr. Knight.

Lord Chief Justice COCKBURN: Who do you say has again transgressed?

Serjeant PIGOTT: We say, my lord, that the company have transgressed, and that Knight, in point of fact, has taken part. He was a director, and also a member of the town commission.

Lord Chief Justice COCKBURN: He has not taken part in his individual capacity, but as a member of the corporation.

Serjeant PIGOTT: He pretends, my lord, that he has taken part as a member of the town commission.

Justice CROMPTON: Has he taken part in anything analogous to the subject-matter for which he was before indicted?

Serjeant PIGOTT: Oh, yes, my lord; the breaking up of the public streets.

Justice CROMPTON: He was only indicted as one of the proprietors of the land.

Serjeant PIGOTT said Mr. Webberly, who was now the chairman of the company, was indicted as an individual, and acquitted. He had nothing to do with any private lighting, but he was a director of the company. There were two or three workpeople, but no other directors or shareholders, except Knight, convicted.

Justice WIGHTMAN said Knight was not convicted *quâ* corporator; but, because, in his individual capacity, he had taken part by giving orders.

Lord Chief Justice COCKBURN: Has he done anything now in his individual capacity?

Serjeant PIGOTT: Yes, my lord.

Justice BLACKBURN: Mr. M'Mahon says he has done nothing.

Serjeant PIGOTT: My answer is, that he has done an act; but then he puts it in another character—that he fills three or four positions.

Lord Chief Justice COCKBURN: You find the corporation is named as a corporation, and then an individual is named as an individual, as distinguished from the corporation. *Primâ facie*, the presumption would be, that it was with reference to his individual acts that he enters into that undertaking. Then comes the question—has he done anything other than as a member of the corporation?

Serjeant PIGOTT: First of all, my lord, it is extremely hard to bring home to a company any order or any act; and so you put members of the company, who, you think, have acted, into your rule, inasmuch as the undertaking of the company is good for nothing.

Lord Chief Justice COCKBURN: You must bear in mind the facts of this particular case. You complain, not only of the corporation having done certain things, but that individuals, independent of the corporation, have also transgressed the law. Must we not take it with reference to the particular facts of this case, that Mr. Knight was mentioned *nominatim* with reference to anything that might hereafter be done by him in his individual capacity, as distinguished from his corporate capacity?

Serjeant PIGOTT said that would depend upon the construction of the undertaking. He was only mentioning the reason why an individual must be put into the undertaking—viz., that the company were let off with a nominal fine, and their undertaking was good for nothing; it was mere waste paper, unless they made a director individually responsible; because if the company transgressed, an attachment could not issue against them as such. He might state that in this matter, there were a great number of affidavits on both sides. The sole object of the prosecutors was that these parties should not do that which the court had held to be a violation of the law, and which they had given an undertaking not to do. If there had really been any misunderstanding or misapprehension about the matter, he was not at all anxious to press the point for an attachment. The prosecutors only wanted it understood *boni fide* that the defendants would not attempt to take from them the rights which they had acquired by Act of Parliament of private lighting, and that the defendants should not do that under the colour and pretence of their acting side by side with the town commissioners. Mr. Knight had withdrawn from the company; he did not say when, but the fair inference was that it was since the rule was granted. Mr. Webberly had now become chairman of the company; and, if he were content to give an undertaking to *bonâ fide* obey the law, and not disturb the streets at all, the prosecutors desired no more. He could not make a fairer offer than that the rule should be suspended if the chairman of the company would give that undertaking.

Lord Chief Justice COCKBURN: What do you say to that, Mr. M'Mahon?

Mr. M'MAHON: I am prepared with a great many affidavits to show that we have literally complied with the undertaking.

Justice WIGHTMAN: If I understand Serjeant Pigott, he is willing to let bygones be bygones; but will you guarantee for the future?

Mr. M'MAHON: The prosecutors are a gas company, and they have been for years doing the same thing on the very same authority.

Lord Chief Justice COCKBURN: That has nothing to do with it. We cannot go into the merits of the case; it has been tried already.

Mr. M'MAHON: When the defendants are asked to enter into a new undertaking, we have a right to consider whether or not the prosecutors are persons who are entitled to any consideration, whether or not they are persons who come here with clean hands.

Lord Chief Justice COCKBURN: We have nothing to do with that. You have entered into an undertaking, and you must abide by it. You were in mercy before them; and one of the terms agreed to was that the sentence of the court should be nominal, upon the condition that a certain undertaking should be entered into. You had the benefit of that, and you cannot be now heard to show cause why those terms should not be enforced.

Mr. M'MAHON: We have adhered to the undertaking. We are ready to show, beyond doubt, that we have not, in the slightest degree, violated those terms.

Lord Chief Justice COCKBURN: That is a totally different matter; you were going into the merits of the case. Has the defendant Knight broken the undertaking which he entered into?

Mr. M'MAHON: Not in the slightest degree.

Justice WIGHTMAN: You prefer taking it as it stands to accepting those terms?

Mr. M'MAHON: We say that we have not, in any manner, violated the terms.

Justice WIGHTMAN: They say, however that may be, we will waive it; will you agree not to do it for the future? The only question is, whether you will accept the terms?

Mr. M'MAHON: On behalf of the company, I should be prepared to assent to the terms, but Mr. Knight has ceased to be a director or a member of it, and I do not know that he would consent. I have no authority from him to enter into any new undertaking on his behalf. On behalf of the company, I believe I am prepared to do it at once.

Serjeant PIGOTT: If Mr. Knight has ceased to be a member of the company, we care nothing about him and the old undertaking. Our object is to have a *bonâ fide* understanding with the company which they cannot very well depart from hereafter.

Mr. M'MAHON: I am sure my learned friend will not say that the undertaking of the company is not available and good against the proper officers of the company, and we are prepared to adhere to that undertaking literally.

Lord Chief Justice COCKBURN: Then, perhaps it had better stand over. Let the rule be enlarged, and the matter will not be mentioned again if the company really abide by the undertaking.

Miscellaneous News.

CITY OF LONDON GASLIGHT AND COKE COMPANY.

The Half-Yearly Meeting of the Proprietors in this Company was held at the Works, in Dorset Street, on Wednesday, Aug. 7—ROBERT ALEXANDER GRAY, Esq., in the chair.

The notice convening the meeting having been read, the corporate seal was affixed to the register.

The SECRETARY (Mr. R. J. Millar) read the minutes of the last half-yearly meeting, which were approved. The following report and statement of accounts were then presented:—

Your directors are much gratified to introduce their report by announcing that on the 14th of June, the negotiation with the New River Company for the purchase of their interest in the property on which the larger portion of your works is erected, was completed, the purchase was then paid, and the assignment duly executed.

Your directors also report that the new tank and gasholder, to which reference was made at Christmas, are completed, and, your engineer reports, to his entire satisfaction. Your directors have pleasure in bearing testimony to the ability and unremitting attention evinced by the contractors, Messrs. Westwood and Wright, in this erection—pronounced by all who have examined it to be a masterpiece of workmanship; and they anticipate deriving essential advantage from this additional gasholder room in the coming and ensuing winters.

During the half year, the anxious attention of your directors has been directed to a project, by which it is feared the interests of the company would be seriously affected—namely, the proposed embankment of the river Thames. The free use of the river, as heretofore enjoyed, is obviously of such vital importance to the company, that your directors could not, without much alarm, hear of the possibility of its being interfered with; and, attended by your solicitor and surveyor, they were favoured with several interviews with the commissioners appointed by her Majesty to consider the question. At these interviews, your directors, while they urged on the commissioners the claims of the company, deprecated all intention of seeking to impede an undertaking deemed essential to the public good; and they have much gratification in recording their sense of the courtesy with which their statements were listened to, and the great desire evinced by the commissioners to give every consideration to the same. The report of the commissioners having only just been issued, your directors have not had the opportunity of examining its details.

The accounts for the half year duly certified by the auditors will now be submitted. The rental for the six months is £42,575. 14s. 8d., and for the year ending at Midsummer, £81,647. 16s. 10d., the latter being an excess as compared with the year ending at Midsummer, 1860, of £614. 1s. 3d.

The profit and loss account for the half year, as per No. 1 statement, shows a net balance of £3300. 3s. 6d. subject to income-tax; this amount, as your directors anticipated, is less than that of the corresponding half year of 1860, and they feel assured the shareholders will have been prepared for this result from the extreme pressure of the winter. Coals had to be obtained at any cost, the navigation of the river was for a considerable period suspended, so as to render the delivery of them at the wharf a matter of great difficulty and increased expenditure, and the season altogether was one of intense anxiety to your directors. They are, however, happy to add that throughout the whole period the district was amply supplied with gas.

Your directors would here observe that the circumstances to which they have thus briefly referred, confirm all that has been said as to the price of 4s. per 1000 feet being inadequate to sustain a becoming dividend, and to provide for the contingencies to which every gas company is subject.

The amount at your disposal per No. 2 statement is £12,855. 19s. 10d., subject to income-tax. Out of this amount your directors unanimously recommend you to declare a dividend for the half year as before, viz., on the A shares at the rate of £7 per cent. per annum, on the B shares at the rate of £4 per cent. per annum, and on the new shares from the date of payment of the respective calls at the rate of £7 per cent. per annum, the whole to be paid free of income-tax; and your directors, in deference to the oft-expressed wishes of many of the shareholders, recommend you to declare the above dividend, to be payable on the first Tuesday in October, instead of the first Tuesday in November, and on every succeeding Friday and Tuesday.

Your directors have, during the half year, issued bonds for £7100, making, with what has been previously reported, £24,350 received under the borrowing powers of the Act of Parliament; and, they have also during the half year made a further call of £1 per share on the 8000 new shares which have been issued. It was made payable on the 18th July, and nearly all has been received by the company's treasurer.

Your directors have further to report that Mr. Ernest Milliken, who has been in your service, first as collector, and subsequently as counting-house clerk, since the year 1832, and is now nearly 80 years of age, found it necessary, from age and infirmity, to tender his resignation at Midsummer; your directors have accepted the resignation; and, as Mr. Milliken has been a faithful and diligent officer of the company for nearly thirty years, they recommend him to your favourable consideration for superannuation.

Your directors close their report by stating that, agreeably to the notice which has been issued, it now devolves on you, in accordance with the provisions in the Companies Clauses Consolidation Act, 1845, to elect two directors and one auditor in the place of the gentlemen who retire by rotation. These gentlemen are J. Hadland and W. Curling, Esqrs., directors, and S. T. Prior, Esq., auditor. They are severally eligible for the respective offices, and hereby offer themselves for re-election.

R. A. Gray, Chairman.

Dr. *Statement of Profit and Loss, for the Half Year ending Midsummer*, 1861. *Cr.*

To Cost of coals, including porterage	£27,034	4	1	By Rental	£42,575	14	8
Rents, rates, and taxes	971	17	0	Coke	10,571	5	2
Wages	8,711	5	6	Breeze	363	1	0
Directors and auditors fees	506	2	0	Liquor	455	11	0
Salaries	1,994	12	6	Tar	1,395	19	6
Tradesmen's accounts	4,336	4	7	Old materials, &c.	376	11	2
Repair and depreciation of meters	1,247	3	7	Transfer fees	6	15	6
Petty cash disbursements	980	14	5				
Interest	1,311	0	9		£55,744	18	0
Bad debts, &c.	351	10	1				
Balance	8,300	3	6	Balance of profit brought down	£8,300	3	6
	£55,744	18	0				

Dr. *General Balance-Sheet, Midsummer*, 1861. *Cr.*

To Capital	£360,406	0	0	By Plant	£349,168	19	10
Loan-fund, with interest to date	19,446	14	4	Leasehold property	5,184	0	0
Debenture bonds, ditto	24,907	19	0	Amount due for lights	£21,242	13	1
Reserve-fund	8,557	12	0	Ditto coke, &c.	4,693	15	5
Mr. Benham's benevolent-fund	1,000	0	0	Ditto sundries	18,162	4	5
Amount of debts due to sundries	9,736	3	9		44,098	12	11
Balance carried down	12,855	19	10	Amount of cash on hand	£7,156	8	0
				Ditto petty cash	2	19	1
				Ditto City gas shares	4,150	0	0
					11,309	7	1
				Stock on hand—			
				Coals, &c.	£1,763	0	0
				Materials	2,439	14	5
				Meters	22,946	14	8
					27,149	9	1
	£436,910	8	11		£436,910	8	11
				Balance of profit brought down	£12,855	19	10

J. T. Hadland, S. T. Prior, } *Auditors.*

The Chairman, in moving that the report and accounts be received and adopted, said: Gentlemen, I am now in a position to give you some explanations in reference to our proceedings during the last half year. The report has very properly stated that for some portion of that time, we, in common with all gas companies, suffered great inconvenience, owing to the severity of the weather. We believe that such a season had not been experienced for thirty or forty years previously: and, as it was preceded by a long continuance of south-westerly winds, during which few coal-ships arrived in the river, the inconvenience to which we were exposed was very much aggravated. Knowing the circumstances in which we were placed in regard to stowage, we thought it necessary to take every possible precaution, in order that the company might have an ample supply of coal; and, with that object in view, we chartered two steam vessels; and, if they had arrived with that regularity which we expected, we should have received 1200 tons every nine days. Owing, however, to a number of untoward events, there were long intervals between the arrivals of these vessels. The weather then set in with great severity, and at one period, the river was unnavigable. By very praiseworthy exertions on the part of our lightermen, and also on the part of our own officers, in giving a quick dispatch to the lighters, we were enabled in one week to bring up from the river, I think, fully 3000 tons of coal; and in the course of three weeks, nearly 10,000 tons were landed upon the works. We also thought it necessary in consequence of the disappointments to which we had been subject, and with a view to prevent any serious consequences to the company, to enter into an agreement with Messrs. Cockerell, to produce on the works by carts a certain quantity of coals. We were aware that it might not be required that that condition should be fulfilled, but we felt that with a company like this, which was supplying a large portion of the metropolitan community with gas, we were bound, whatever the expense incurred might be, to adopt every precaution to prevent disappointment to our consumers, for it will readily occur to you that if in only one instance we had failed, we should have been exposed to very serious injury. Happily, however, we were able to avert those consequences, and I earnestly hope we may never experience such a severe winter again. To guard against the possibility of contingency, we have this year made arrangements to land in the Victoria Docks 5000 tons of coal, to be kept in depôt there ready to be brought to the works when necessity arises. We shall also have storeage upon our own premises for 6000 tons more, which we could not have last winter, as our works were very much filled up with machinery and materials employed in the construction of the new gasholder. That gasholder is now finished, and, I believe, we shall derive considerable advantage from the money expended in its erection. One thing is perfectly clear that having that additional accommodation, and also the increased storeage room, all apprehensions of failure in the future will be entirely removed, for we shall now have upon our works three-fourths of the actual quantity of gas required during the period of the greatest consumption. We have used as much in one week as 2300 tons of coals during the severe weather. Our rental this year does not show any very great increase, but that may easily be accounted for. You are aware that, owing to the system of the early closing of shops and warehouses, there is necessarily a considerable diminution in the consumption of gas. Our rental has increased, as the report correctly states, only about £600 during the year. The year before, there was a very considerable increase over the previous one; but we cannot expect that each succeeding year should show an increase in the same proportion, which, in the year alluded to, was something like £5000. For the three preceding years, our coals stood us in 14s. per ton; but, during the last half year, owing to the weather and other circumstances, they cost us 17s. 11d. Our consumption was 27,200 tons, so that the additional 4s. per ton has taken £5440—an amount which, in ordinary cases, would have been part of the profit of the company. Happily for us, I believe that such a contingency will not again arise, or, if it does, we shall be better prepared to meet it. Notwithstanding all that I have referred to, we feel that we are still justified in recommending for your adoption the payment of the same dividend as before; and, after paying the 7 per cent. on the A shares, and 4 per cent. on the B shares, there will be an undivided balance of £1800, in addition to which we have a reserve-fund of £8507. 12s. All things considered, therefore, I think the proprietors will be of opinion that we are not in a bad situation, but quite the contrary. Our coke has sold very advantageously during the last half year; and the products generally have sold better than in the preceding period. Our works are now in a very efficient state; and, without feeling over sanguine, I think I am at liberty to assure you that the operations of the present half year will show a considerable improvement upon the one which the report embraces. You are all aware that the action which was brought against the Great Central Company has been settled by a compromise. The company will have to pay something like £30,000 or £35,000; but I think they exercised a very sound discretion in effecting that compromise, and thus disposing of all the claims made upon them, in consequence of the accident which gave rise to them. I allude to the subject more particularly for the purpose of showing the necessity there is that all gas companies should be in a situation, by the price charged to their consumers, not only to pay a fair and reasonable dividend to their shareholders, but also to lay by a reserve-fund to meet the various contingencies to which they are constantly liable. It must be obvious to every one conversant with business that, not unfrequently through the carelessness of servants, heavy losses may be sustained by employers. We are exposed to have large claims made upon us for accidents arising from no fault on our parts; and it is necessary and right that we should be in a position to meet such claims whenever they do occur. Certainly, with the present price of gas, it is not possible to create such a reserve-fund as would be adequate to such a purpose. I think, gentlemen, I have now stated as much as I am called upon to do, and, in conclusion, I can only express my regret that the accounts do not show a more satisfactory result, although I think, after the explanations I have given, you will not be at all disappointed. You may well suppose that the half year through which we have passed has been one of great anxiety to your directors. I think I never spent a more restless time in my life. I have sometimes almost wished I had been in America—(a laugh)—but I considered it was my duty to do all I could to grapple with the difficulties in which the company was placed, and, in common with my colleagues, I have been most deeply anxious to do everything that could possibly be done to prevent disappointment to the public. I have been ably assisted by my worthy colleagues at the board, and I can say for them, as well as for myself, that, so long as we enjoy your confidence, you may rely upon it we shall relax no endeavour to promote the prosperity of the company. I will not trespass further upon your time, but will sit down, requesting you to put any questions you may think necessary for the further elucidation of the accounts, which I shall have much pleasure in answering, as I hope, to you entire satisfaction.

Mr. Box: I fully concur in the greater part of the chairman's observations. I have gone into the statistics of the company for the last few months, and I am satisfied, from the investigation I have made, that considerable attention must have been paid to the interests of the company to produce the results which have been stated. I find that, as regards the unaccounted-for gas, we are in an improved condition as compared with the former half year; and I will give you the results of my calculations on the subject. But, first of all, I will give you the increase of our rental upon a comparison of the quantity of coals used for the half years ending Midsummer, 1860 and 1861. The increase is ·36, making a total or gross amount of £98. 5s. 2½d.; which is certainly a step in the right direction. I make out that the price you have paid for coals, including porterage, is 19s. 8d. per ton.

The Chairman: I dare say you are about right. I did not include the porterage in the amount which I gave.

Mr. Box: I think I may say I am sure I am right. I was rather surprised to find it was so low. For the corresponding period last year, the price was

15s. 0¼d.; so that the total increase this year upon the quantity consumed, makes a considerable sum. But, it must be borne in mind, that you used 1191 tons less than in that half year, and there has been a decrease in the revenue of the company, upon the quantity consumed, of £1700, which was certainly to be expected. I am sure there has been great attention paid to the working of the concern, and I, as a proprietor, am perfectly satisfied with it. The unaccounted-for gas this half year, I make out to be 23 per cent.

The CHAIRMAN: I think you are about right.

Mr. BOX: I have taken it in three ways—first, the quantity of gas produced for the coals consumed; second, the rental received; and third, the quantity of coal used in excess for the supply of the public, and I find the result the same in each. May I ask whether there is any intention on the part of the directors to raise the price of gas to the consumers?

Mr. WARD: I must protest against such questions being put, as being very detrimental to the interests of the company, and I hope the chairman will not give any reply.

Mr. BOX: If the chairman says it will be impolitic to do so, I will not press the question.

The CHAIRMAN: Let Mr. Box proceed. Of one thing you may be perfectly satisfied, and that is, that I will give him no information that could operate prejudicially to the company.

Mr. BOX: I have no wish to prejudice the interests of the company. I know that one company has raised the price of gas, and I did not know whether it might be the intention of the directors of this company to do the same. I have nothing further to say, for I consider the report of the affairs of the company most satisfactory.

The CHAIRMAN: It is very gratifying to the feelings of the directors to hear what has been said by Mr. Box, for he is a man who has had a great deal of practical experience, and he is accustomed to keep all the companies in good order. My friend is quite right in his calculations; and, in his presence I will say that, to a certain extent he has done a great deal of good at various times by the vigilance he has shown in reference to these matters. He is a sort of Cerberus, and looks well after the managers of gas companies, to see that they keep all things in a proper state. He will not allow any director to be paid for services that he does not render; and he keeps a very close look out after the officers as well. But, I am persuaded of one thing—that, if he puts questions at these meetings which he is told ought not to be answered, he will have good sense enough not to press them. I do not know what may hereafter take place in reference to the price of gas; all I can say is, that if we could obtain 6d. per 1000 feet upon the price we now charge, I should be most happy to accept the offer.

The motion was then put, and carried unanimously.

Mr. WARD: Mr. Chairman and Gentlemen,—I have to congratulate this meeting upon the report we have received to-day, as to the affairs of the company; and, in proposing the resolution which has been put into my hands, I think I ought to bear my testimony to what has been stated as to the very exceptional circumstances in which this company have been placed during the last half year. As I am intimately connected with gas companies, I am, perhaps, better able to confirm what has been said than any other person present. I know that it was a very serious question last winter, whether or not London would not be almost left in darkness. I had frequently to come down to the City Company for advice and assistance on behalf of another company with which I am connected, and I can assure you that, whenever I did so, I always found the captain at his post, watching over our concerns with the greatest attention and anxiety. I think, under all the circumstances which have been referred to, the report and accounts you have received are most satisfactory, and fully warrant the recommendation of the directors in regard to the dividend. I have, therefore, much pleasure in moving—"That, agreeably to the recommendation contained in this day's report of the board of directors, a dividend out of the profits of this concern, for the half year ending midsummer last, be now declared, as follows:—On the A shares, at the rate of 7 per cent. per annum; on the B shares, at the rate of 4 per cent. per annum; and on the new shares, at the rate of 7 per cent. per annum, on the amount of the respective calls that have been made, from the days on which they were severally paid; the whole to be paid, free of income-tax, at the company's office, on the first Tuesday in October next, and on each succeeding Friday and Tuesday, between the hours of twelve and one o'clock."

Mr. HOWELL seconded the motion, which was carried unanimously.

The CHAIRMAN: In the report which has been read, we stated to you that an old and very efficient officer of the company had found it necessary, from advanced age, to retire from his duties here. During the time he has been in our establishment, no person could more assiduously have discharged his duty than he has done. It is quite clear that a company cannot give such a remuneration to their clerks as to enable them to make a proper provision for themselves when overtaken by the infirmities of age. We think it is a very great encouragement to officers to use their best energies to promote the interests of the company to know that, when the circumstances to which I have referred arise, the directors and proprietors will take their case into consideration; and I am sure that I do not misrepresent the feelings of all present when I express a confident expectation that you will grant to Mr. Milliken, who is now 80 years of age, and therefore will not, in all probability, long enjoy your bounty, such an allowance as will, during the time that Providence may spare him, enable him to pass the remainder of his days in comparative comfort. The resolution I have to propose is—"That, in consideration of the long and faithful services of Mr. Ernest Milliken, late counting-house clerk, he be allowed, during the pleasure of the directors of the company, a pension of £130 pounds per annum, to be paid quarterly, the first payment to be due at Michaelmas-day next.

Mr. LAVANCHY: I feel the greatest pleasure in seconding that resolution. I think that, when the conduct of our servants commends them to the notice of the directors, the proprietors at large should never stand in the way of any recommendation which comes in this way before us; and, in expressing my own feeling in the matter, I express, at the same time, the feeling of every person present.

Mr. KENNETH: I have much pleasure in supporting the resolution, because I think it is right, on principle, that a faithful officer should be rewarded for his services, and that, in thus rewarding him, we offer an encouragement to others to follow his example.

The motion was unanimously adopted.

Mr. E. HUNT: I rise to propose that Joseph Hadland, Esq., be re-elected a director of this company, and I do so with much pleasure, for I am persuaded that he is "the right man in the right place."

Mr. WARD seconded the motion, which was cordially adopted.

Mr. MAUGHAN proposed, and Mr. PERRY seconded, the re-election of William Curling, Esq., which was also unanimously adopted.

Mr. H. WALMESLEY moved the re-election of S. T. Prior, Esq., as an auditor; which was seconded by Mr. FENN, and carried.

Mr. HADLAND: I beg leave to thank you for re-electing us as directors. My friend, Mr. Curling, would have been here to thank you on his own account; but is prevented by indisposition, and has desired me to make the *amende honorable* for him. For myself and him, I can assure you that our best services will be continued to promote the prosperity of the company.

Mr. PRIOR also returned thanks on his re-election.

Mr. WARD: It is my pleasing duty and privilege to propose—"That the thanks of the meeting be given to the chairman, deputy-chairman, and directors, for their attention to the interests of the company during the past half year." The meeting is now well aware, from the statements in the report, of the various sources of anxiety which have rendered their labours peculiarly onerous during that period. They have had to contend with the difficulties arising from the severity of the weather; they have had anxieties arising out of the project for the embankment of the Thames, and also connected with the erection of the new gasholder, which, I believe, is the only one in the world of the kind; and I think it must be very gratifying to the proprietors to find that they have carried on the affairs of the company amidst all with satisfaction to the public as well as to themselves. Whether the future of the company is prosperous or not, we owe to the directors our best thanks for what they have done to make it successful; and I am sure the proprietors will cordially join in this expression of their obligations.

Mr. MAUGHAN seconded the motion, which was very cordially adopted.

The CHAIRMAN: Gentlemen, I assure you it is most gratifying to the feelings of the directors to receive this mark of your continued approval of our conduct. I sincerely hope we shall always enjoy your confidence; for, while we possess that, we have the strongest encouragement to do all in our power to promote your interests. If, in anything that we undertake, we are not so successful as we could desire, I am sure you will place the most lenient construction upon our actions, because you know that we are always influenced by sincerity of motive in what we do. For myself and my brother directors, I beg you to accept our thanks for your kindness.

Mr. MAUGHAN proposed, and Mr. PERRY seconded, a vote of thanks to the auditors, which was carried, and acknowledged by Mr. J. T. HADLAND, and the proceedings terminated.

EUROPEAN GAS COMPANY (LIMITED).

An Extraordinary General Meeting of the Proprietors of this Company was held on Wednesday, August 7, at the offices of the company, Frederick's Place, Old Jewry—SHEFFIELD NEAVE, Esq., in the chair.

After the usual formal preliminaries had been complied with,

The CHAIRMAN said: Gentlemen, I need not detain you long upon the purpose for which this meeting is held. It was decided at the last meeting that power should be given to the directors to raise a sum of money, to be at their disposal as occasion required, and the sum fixed upon was £25,000. All present were unanimously of opinion that, as our business extended, it might be useful to us financially to have that sum at command, and it was agreed that we should place ourselves in the position in which we had heretofore always been with reference to the power to raise money upon bond or otherwise for the general purposes of the company. In compliance with that opinion, this meeting is summoned, and the resolution which I have to propose is as follows:—"That the £50,000 authorized by the 32nd clause of the regulations of the company, to be raised for the purposes of the company, having been raised and duly expended, to the satisfaction of the shareholders, it is expedient that the directors should be empowered to raise any further loan or loans against any emergency of the company, in one or more sums, from time to time, and on such terms as they shall find expedient. And, therefore, that the said board of directors are hereby authorized to raise and borrow further moneys, to the extent in the whole of £25,000, on such terms and in such manner as they shall see fit, on security of the property of the company; and to create, execute, and issue, from time to time, any mortgages, bonds, notes, and debentures, or other instruments contemplated in the 33rd and 34th clauses of the company's regulations, that the said directors shall from time to time approve, for effectually raising and securing the said loan, or any part or parts thereof."

Mr. PHILLIPS inquired whether the £25,000 now proposed to be raised was to be considered as a second mortgage, or whether it stood on the same footing as the £50,000 lately raised?

The CHAIRMAN replied, that he supposed in law it might be viewed by some as a second mortgage.

Mr. PHILLIPS would be glad if those who had taken part of the £50,000 were assured that theirs was a first mortgage; because, otherwise, the increase of loans deteriorated the security of the first mortgage.

The CHAIRMAN: Only in the case if the increase went on to any overwhelming extent.

Mr. HUGGINS said he presumed that any moneys which were raised stood upon the same footing, because he supposed the company had the power usually given to railway companies to borrow to the extent of one-third of their capital; and, therefore, any one taking part of the £50,000, took it with knowledge of the borrowing powers of the company.

Mr. BEDDOME (solicitor): You do not stand in the same situation as a railway company, but your powers are conferred by your own particular charter. I take it you are governed by the regulations of your company, as limited and approved by the Government officers; and your regulations do not specify a limited sum of one-third.

Mr. HUGGINS would be glad to know whether the company was bound to anything?

Mr. BEDDOME: You are bound by your own laws. You have no power to raise anything till you pass this resolution.

Mr. HUGGINS: Suppose we pass the resolution?

Mr. BEDDOME: Then you may raise this money.

Mr. HUGGINS: Do not all moneys rank precisely with the £50,000?

Mr. BEDDOME: That is a question. My own opinion is, that the first creditors might object to the priority of the second loan, if they thought fit.

The CHAIRMAN said it seemed to be a question whether the company were in the position of a man mortgaging his estate, and then taking a second mortgage, or whether in the position to which Mr. Huggins had referred—namely, whether all moneys borrowed did not rank equally? The solicitor seemed to think that there might be a doubt; but it did not signify in the least, because, if, on such a property, they could not, without any hesitation or difficulty, borrow £25,000, they had no business to go on at all.

Mr. BROWN (a director): There was no question as to the power to raise the money; that the directors were perfectly satisfied about; but it was a question with them as to which was the best policy—whether, instead of paying the dividends, they should make use of a part of those dividends as capital? The directors, however, thought that what was earned the shareholders were entitled to as speedily as possible, and, under all the circumstances, considered the course proposed the most desirable. If sufficient capital was not employed, they might meet the amount required for working expenses by the expedient of taking credit for their coals; but it had never been their custom to do so. Coals had now become a very important item; for instance, they had increased from 16,000 tons to 26,000, and soon expected

to reach 30,000. Here was something like £40,000 at once, which was expended in ready money for the benefit of the proprietors, thereby effecting a saving in the price of the coals, and freight also. Money was also required for coal-stores. He had that morning left a station where, in consequence of the want of coal-stores, the coals were exposed to the atmosphere, and thus a loss of 300 feet per ton was sustained. Now, coal-stores were very expensive; but still the saving, in the end, fully compensated for the outlay; and, when the proprietors looked to their gradually increasing business, it was a question for them whether they would suffer their directors to be hampered for the want of necessary funds.

Mr. HUGGINS said he agreed with the chairman, that the order of ranking of the bonds was in reality of no importance whatever, and he should have much pleasure in seconding the resolution.

Mr. FAWCETT was of opinion that, the second issue of debentures would be in no way inferior to the first. Every debenture issued was part and parcel of one general mortgage upon the whole work. He should take the new issue of debentures with as much confidence as he took the first, and he felt quite assured that they were of ample value.

The CHAIRMAN said, although £25,000 was the amount that was fixed upon, it was not supposed that that amount would be required. The directors were determined to put the new stations in the most thorough order, feeling that that was the most economical course to pursue.

Mr. PHILLIPS said he was still of opinion that by the new issue of £25,000 debentures, they so far damaged the former issue to that extent.

Mr. BROWN thought the word "damaged" could not be applicable; because, if the directors had asked for £100,000 in the first instance, they would have got it. He might add that the directors did not expect to require more than £10,000 or £12,000.

The resolution was then carried *nem. dis.*, and the proceedings closed.

GLASGOW GASLIGHT COMPANY.

The Annual General Meeting of the Shareholders of the Glasgow Gas Company was held on Monday the 15th inst., in their office, Virginia Street —JAMES WHITE, Esq., of Shawfield, in the chair.

The advertisement calling the meeting having been read, the subjoined report of the committee of management was held as read:—

As instructed by the directors of the Glasgow Gaslight Company, I beg to submit to the proprietors of stock the following abstract statement of their affairs for the year ending May 31, 1861. The directors are gratified that, notwithstanding the depressed state of business during the past year, and the loss the company sustained by the severe frost, they are enabled to recommend the usual dividend of 10 per cent., deducting income-tax, one-half payable on the 1st of August, and the other half on the 3rd of February next, leaving a balance of £1787. 10s. 8d. to be carried to the reserve-fund account, which will then stand at £28,279. 10s. 7d. In anticipation of a decrease in the cost of production, and an increased consumption, the directors, on the 1st of June, reduced the price of gas from 5s. to 4s. 7d. per 1000 cubic feet—a step which they trust they will find themselves justified in having taken. With the discounts at present allowed, the superior quality of the gas produced, and gratuitous supply of meters, the price charged will bear a favourable comparison with that of any other company similarly situated.

The abstract of the balance of the books, at the 31st of May, 1861, showed that the general expenditure on works, including pipes, gas-meters, &c., had amounted to £281,475. 11s. 1d.; additions made at works since last balance, deducting sum set aside for deterioration, &c., £8976. 1s. 4d.; total, £290,451. 12s. 5d.; minimum sum required by the Act of Parliament, invested in the new 3½ per cent. annuities, £5000. The other side of the balance-sheet showed the expenditure to be—by proprietors of stock, holding 6000 shares of £25 each, £150,000; premium on the sale of shares laid out on the works, and on which, by Act of Parliament, no dividends are paid, £49,724. 16s.; reserve-fund account, £26,491. 19s. 11d.; mortgages, £49,500; debts due to tradesmen and others, £31,513. 16s. 5d.; dividends unclaimed, £351. 14s. 11d.; making a total (less floating effects and debts due to the company, £28,355. 15s. 6d.) of £53,009. 15s. 10d.; the net revenue of the year being £16,225. 0s. 8d.

The CHAIRMAN, in moving the adoption of the report, said: It does not occur to me to make many remarks upon the report and balance-sheet which have now been held as read, but one or two points may be adverted to for the information of the shareholders. It will be noticed that the capital account has been increased to the extent of nearly £9000, caused chiefly by the extension of our pipes throughout the city in the suburban districts, in consequence of the great extension of the town. This expenditure is something like the average increase which has taken place for a considerable number of years, and the directors are afraid that they can hardly hold out the prospect of the capital account being closed, so long as the prosperity of Glasgow progresses, and the population increases. At the same time, the directors are very cautious in increasing their capital account, knowing that it will necessarily entail a corresponding increase in the amount necessary for the dividend; yet it will be kept in view, that an increase in the production and consumption of gas enables them to economize their expenditure and produce the gas at a cheaper rate. In this way, the public are benefited to, perhaps, a greater extent than the shareholders, because the dividend payable to the shareholders is only 10 per cent. upon £150,000, the remainder of the capital being raised on mortgage and borrowed money. The revenue of the company during the last twelve months has progressed satisfactorily, and the production of gas has increased in a greater ratio than it has done in any previous year. In recommending a dividend of 10 per cent. to the shareholders, the directors are glad to report that, in consequence of the lessened cost of production, they have been enabled to reduce the price to 4s. 7d. per 1000 cubic feet. A good deal of clamour has of late been raised against both gas companies, for charging at a too high rate for their gas; and some of those agitators take credit to themselves for having been the means of bringing the price down to its present position, forgetting that, in 1842, the directors reduced the price of gas from 6s. 8d. to 5s., without any agitation; and, in 1853, it was again reduced to 4s. 7d. per 1000 cubic feet. The directors were enabled to do this, in consequence of a reduction having taken place in the price of coal. To such an extent did this reduction take place that, in the course of five years, the coal only cost them one-half what it had done before. In 1857, however, they were again obliged to raise the price to 5s.; but it is satisfactory to find that they have now been enabled to reduce it to 4s. 7d. When it is kept in mind that large consumers are allowed considerable discounts from this nominal price, the rate which they actually pay being something like 3s. 10½d., and that the company get no return whatever from consumers for the use of the meters supplied to them, which is calculated at equal to 7d. per 1000 feet, their cost being something like £45,000 to this company alone, the public really have very little cause to complain. The rate charged in Glasgow has been compared with that charged in Liverpool; but the parties who make the comparison seem to forget that the Glasgow gas is of much superior quality to that produced in Liverpool, and that, while the coal which the Liverpool Gas Company uses costs only 12s. a ton, the coal which this company consumes costs 17s. 5½d. Then, the coal which the Liverpool Gas Company use produces a much superior quality of coke, for which they get 8s. per ton, while we only get 5s. per ton for that produced from our coal. In this way, the Glasgow Gas Company are disadvantageously placed, to the extent of something like £15,000 a year, which, upon the gas produced by them, is equal to something about 10d. per 1000 cubic feet. When it is kept in mind, however, that in 1857, when we were in Parliament for an increase of our capital, the gas consumers and the corporation opposed our bill, but, after looking into the state of our affairs, and hearing the explanations that were made to them on the subject, they came to be satisfied that we were only asking what was requisite for the carrying on of the undertaking; consequently, the opposition of all parties was withdrawn, and the bill passed. At the time, an arrangement was made, whereby we were willing to hand over the property, works, and undertaking of both companies to the town council, on their giving us a guarantee of 8 per cent. upon 150,000, being the capital of the company, although, under our Acts of Parliament, we had power to divide 10 per cent. The matter was fully discussed in the town council, and it was ultimately resolved that the corporation should not take over the gas company's works. This resolution was arrived at from the consideration that an independent company were more likely to produce cheaper gas than it could be made under the management of the town council, and possibly, partly from the feeling that such businesses were attended with more or less risk, and that, although the shareholders might get 10 per cent., they were not over remunerated, considering the contingencies to which they were exposed. Under this Act of Parliament, the capital may be increased to the extent of £65,000; but the directors have not yet found it necessary to raise this money. If, however, their works require to be enlarged to meet the wants of the public, they foresee that ere long it will be necessary to avail themselves of the powers conferred upon them. But the public may rest assured that the directors will exercise every economy, and will avail themselves of every improvement which can be suggested in the manufacture of gas, so that the public may be supplied at the lowest possible rate; and it will give the directors great pleasure if they are enabled to produce it at such a price as has been pointed at by the Gas Consumers Association—namely, 4s. per 1000 feet. It is quite absurd, however, to fix upon this rate, or indeed any rate, because the cost of production is so very materially dependent upon the price of coal, the rate of interest, and the value of labour, that, like other commodities, it must fluctuate, and the cost of the raw material is such an important element in fixing the price to be charged for the gas, that the directors must be left to their own discretion as to the time and mode on which that reduction is to take place. Being satisfied, however, that an increase in the quantity of gas produced would enable them more readily to lower the price, they are of opinion that an extension of the works is likely to benefit the shareholders, and, at the same time, prove beneficial to the public, as it is notorious that a large quantity of any commodity can always be made at a cheaper rate than when the quantity is limited. Mr. White concluded by moving that the report of the directors on the state of the affairs of the company, as at May 31, 1861, which has already been printed and circulated, be adopted, and that it form part of the minutes.

The resolution was seconded by Mr. WM. SMITH, and carried.

The second resolution—"That Messrs. John Smith, Hugh Brown, Chas. M'Kenzie, and Wm. M'Lean, whose term of office now expires, be re-elected directors of the company"—was proposed by the CHAIRMAN without remark, seconded by Mr. JAMES ROBERTSON, and also passed, no one dissenting.

The third resolution, which was in like manner proposed by the CHAIRMAN, seconded by Mr. JOHN SMITH, and carried, was as follows—"That Messrs. Wm. Smith, Wm. Brand, and Matthew Cruickshank, be re-elected as auditors, with a vote of thanks for their past services."

The meeting then tendered a vote of thanks to the directors for their efficient services during the past year; and, after a similar compliment to the chairman of the meeting, moved by Mr. CHARLES M'KENZIE, and seconded by Mr. GEORGE STEVENSON, the meeting adjourned, the proceedings having lasted scarcely half an hour.

METROPOLITAN BOARD OF WORKS.

A meeting of the Metropolitan Board of Works was held at the office, in Spring Gardens, on Friday last—J. THWAITES, Esq., in the chair.

METROPOLIS GAS ACT, 1860.

A report was brought up from the finance committee, upon letters received from Mr. Beal, relative to payment of the expenses of the Metropolis Gas Act, 1860. The committee stated that, in accordance with the resolution of the board, of the 26th of July last, they had carefully considered Mr. Beal's letter, stating that the delegates were prepared to settle Mr. Wyatt's claim for extras, on the board paying the amount of their taxed costs, £676. 11s. 7d., and, that Mr. Wyatt would, on that being done, be prepared to accept the amount due to him, less the £1413 received by him on account. The committee had conferred with the solicitor of the board on the subject, and obtained the opinion of Mr. John Gray as to the course to be pursued under the circumstances. The latter gentleman considered that the board might safely pay Mr. Wyatt the sum of £1620. 18s. 10d., being the amount of his account, less the sum of £1413 already received by him; but that, in reference to Mr. Beal's account of £676. 11s. 7d., it would not be safe to pay him without the production of the authority of the subscribers to the fund raised for defraying the expenses of obtaining the Act. The committee, therefore, recommended that the sum of £1620. 18s. 10d. being the balance of his account, as taxed, be paid to Mr. Wyatt upon his giving the board a receipt in the form advised by their solicitor, and that a cheque for that amount be drawn accordingly. They further recommended that a communication be addressed to Mr. Beal, informing him that, as at present advised, the board were unable to recognize the arrangement between the delegates referred to in his communications, and could not pay over the sums of £676. 11s. 7d. and £1413 without the production of the authority of the subscribers to receive them. The committee stated that they had examined Mr. Dangerfield's account of £65. 17s. 8d. for services in connexion with the Act, to which the difficulties above referred to did not appear to apply, and they, therefore, recommended that it be paid, and that a cheque be drawn for the amount.

The report of the committee was agreed to.

SALE OF GAS ACT: METROPOLIS GAS AMENDMENT ACT.

Mr. VULLIAMY, the superintending architect, read the following report on this subject:—

Pursuant to the resolution of the board, I have ascertained the steps necessary to be taken for putting in force the Sale of Gas Act.

Under the Act which has just received the royal assent, entitled "the Metropolis Gas Amendment Act, 1861," all powers conferred on justices by the previous Acts are, so far as relates to the metropolis, transferred to the Metropolitan Board of Works; and so many of the said powers as are conferred by section 4 of the Sale of Gas Act of 1859 are required to be exercised by the board within two months from the passing of the Act of the present year, that is before the 6th of October next.

The chairman informed the board at their last meeting that he endeavoured to procure an extension of this very limited period, to which the promoters of the bill were willing to assent; but they stated that her Majesty's Government declined to

agree to such an extension, because, under section 18 of the Act of 1859, as amended by the Act of 1860, no meter is allowed to be sold after the 13th of October next, unless the same shall have been stamped by an inspector to be appointed under the provisions of the said Act.

The powers required to be exercised by the board under section 4 of the Act of 1859 are, to determine the number of copies of models of gasholders with proper balances, indices, and apparatus requisite for testing meters within their jurisdiction; to direct such copies, verified and stamped at the Exchequer, together with such a number of stamps as they shall deem requisite to be prepared; to fix the places where such copies and stamps shall be deposited; to appoint a sufficient number of inspectors of meters for the safe custody of such copies and stamps; and for the discharge of the other duties mentioned in the Act; to allot to each inspector a separate district, and to direct what reasonable remuneration shall be paid to such inspectors. Experience alone can determine the number of inspectors which may ultimately be required, and the proper extent of their duties, together with what quantity of apparatus will be needed to enable them adequately to discharge their duties; but, as the clause contains powers to subdivide and reallot districts, and to suspend or dismiss inspectors, it will only be necessary at present to take steps for appointing the minimum number that will be required; and I would suggest that the districts at present superintended by your assistant engineers might form a basis for the exercise of your powers, and that it might be convenient to commence operations by the appointment of the same number of inspectors—viz., three; one for the south side, and two for the north.

The office being one of recent creation, there is some difficulty in advising the board at what rate it would be possible to obtain persons of adequate skill, and of sufficient standing to render valid the recognizances into which they are required to enter by section 8 of the Act of 1859. Questions will also undoubtedly arise from time to time in the exercise of their duties between the public and the gas companies, requiring great firmness, and the strictest integrity and impartiality on the part of the inspectors. For these reasons, the corporation of the City of London have appointed an officer at a salary of £200, but, as at the outset, the inspectors will require to be in some degree educated up to their duties, becoming more efficient having been some time engaged in their discharge, the board may find some advantage in fixing the remuneration at a lower sum to commence with, holding out the prospect of a steady annual increase.

The number of verified copies of the Exchequer standard gasholder that each inspector will require, will depend upon the number of meters sent in for stamping at one time, a number which will probably be somewhat variable. The corporation have already ordered ten, all of which may be used simultaneously by one inspector. I think, however, that probably, if the board provide each of these officers, at the outset, with two instruments, one of the cubic capacity of one foot, and another of ten feet, they would be able to meet the most pressing emergencies, and time would be afforded to ascertain how many would be needed for permanent working.

The cost of these instruments is, I am informed, from £25 to £30 for the smaller, and from £35 to £40 for the larger. The board will probably hereafter direct that tenders should be invited from the leading makers; but, as time is very pressing in the present instance, I would suggest that the course pursued by the corporation might be adopted—viz., to order their preparation at once by Messrs. Parkinson.

I would, therefore, recommend the board to order the insertion of advertisements, stating on what day they will be prepared to nominate three inspectors of gas-meters; that three large and three smaller gasholders be forthwith ordered; and that I should be authorized to obtain for the board, prior to their next meeting, such information as they will require, for providing suitable premises for the operations of the inspectors.

The CHAIRMAN said this was really a most important question, and the board had no time to lose before making the necessary arrangements, as, within two months from the passing of the Act, they were required by the Legislature to bring it into operation. As this was the last meeting of the board prior to the recess, it was necessary to take some steps before they separated, and he thought the least they could do was to order the requisite apparatus to be prepared, which probably would take some time to make. They might, it was true, issue advertisements inviting tenders, but this would inevitably lead to delay, and prevent the board complying with the terms of the Act, because, after the 13th of October, all meters which were fixed must be such as were stamped by the inspectors.

Mr. CRELLIN said he would move that the report of the superintending architect be adopted, so far as related to obtaining the necessary instruments specified by the Act of Parliament.

The CHAIRMAN said it would be also necessary to consider what should be done in reference to the persons to be elected. Probably the better course would be to authorize the insertion of advertisements, stating that at their next meeting the board would be prepared to receive applications from candidates for the office. They could then refer the matter to a committee to examine the testimonials of such persons, and report to the board as to their qualifications for the discharge of the important duties which the inspectors would have to perform. If that were done, they might, within a week afterwards, proceed to the election, and thus be prepared, within the two months, to bring the Act into operation.

Mr. LE BRETON said there was another matter which should now be settled—viz., the amount of salary to be paid to the inspectors. He did not think they could offer less than the corporation had given, because they must place their officers in such a position that they would be above taking bribes in the fulfilment of their duty.

Mr. DIXON coincided in the remarks of the last speaker, and the more so that he found the board were not very ready to increase the salaries of their officers.

Mr. LE BRETON proposed that the salaries of the inspectors should be £200 a year.

The CHAIRMAN said the City of London was already provided for. It was only proposed by the committee, in the first instance, to elect three inspectors—one for the south, and two for the north side of the metropolis. This would enable them practically to test the wants of the districts within their jurisdiction; but he very much questioned whether that number would be found sufficient. It would be easy, however, to increase the strength of their establishment as experience might indicate.

Alderman LAWRENCE said it was clear there was no time to be lost, for, even when the apparatus was fitted up, it would be very difficult to get everything ready for stamping meters by the 13th of October, after which time no fresh meters could be sold except they bore the stamp of the inspector. The Act of Parliament spoke of "the metropolis;" but he believed the term did not apply in the same sense as that in which it was applied in the Metropolis Local Management Act. It appeared to him that the City of London was excepted, although, from the report just read, it might be supposed that it was included. The matter was one requiring great care and attention, and he was sure the superintending architect would find that it would take up a considerable deal of his time.

Mr. FREEMAN thought it was not expedient at this meeting to settle the terms of the salaries of the inspectors.

Mr. LE BRETON differed from Mr. Freeman. He thought it might be some guide to the board, if they were informed that the county magistrates, in considering the subject, had thought it would be necessary to have four inspectors, at a salary of £200 a year each. The board were only about to appoint three; and it should be borne in mind that the expenses of carrying out the Act would not be a tax upon the metropolis, but would be provided for by fees on stamping meters.

Mr. DIXON said the four inspectors which the magistrates had thought of appointing were for Middlesex only, and not for the whole of the metropolis.

Mr. LE BRETON: The fees will pay all the expenses.

The CHAIRMAN said that, no doubt, to a certain extent, the fees would pay the expenses; but he was fearful that, in the end, it would be found that a portion would have to come out of the rates. He wished to know whether it was the pleasure of the board that the salaries of the inspectors should be fixed at £200 a year?

Mr. BIDGOOD said he must confess that, as far as he was concerned, he was voting in entire ignorance of the subject, and must take all that he had heard on trust. He thought, however, it would be far better, if arrangements were made, that the metropolitan boroughs sending Members to Parliament should be the boundaries of the respective districts of the inspectors, instead of the ill-defined boundaries proposed in the report.

Mr. LE BRETON said that suggestion could not be adopted; otherwise, Chelsea and Kensington would have no inspectors.

Mr. BIDGOOD said the whole matter would ultimately have to be gone over again; and, therefore, perhaps the board would not err in adopting the report, and fixing the salaries at £200 a year.

The motion for the adoption of the report was then agreed to, and the requisite advertisements ordered to be inserted.

REPORT OF MR. HAYWOOD ON THE SUPPLY OF NAPHTHALIZED GAS TO STREET LAMPS.

Mr. HAYWOOD, engineer to the Commissioners of Sewers for the City of London, presented the following report at the meeting of the commissioners, on Tuesday week:—

To the Honourable the Commissioners of Sewers of the City of London.

Gentlemen,—I beg to report that, in pursuance of the resolution of the court, of the 23rd of April last, I have directed an experiment, with the view of testing the value of the application to the public lamps of the process patented by the United Kingdom Carburating Gas Company.

The patent of this company is for placing near to the gas-burners a receptacle containing coal-naphtha; the gas passing through, or over this, takes up, and becomes enriched by, the addition of the volatile hydrocarbons contained in the naphtha, and the illuminating power of the gas is thereby increased. The quality of the naphtha employed determines mainly the degree of illuminating power gained, and the chemical and photometrical experiments laid before me show that it varies from 25 per cent. to 77 per cent.

The experiment being one in which the gas companies are much interested, I applied to the Chartered Company (who light Moorgate Street), suggesting their co-operation in conducting it with me. The suggestion was at once acceded to, and their inspector, Mr. Johnson, was placed in communication with me for that purpose. Moorgate Street was selected as well adapted for the experiment, there being an equal number of lamps upon each side of the way, but one or two private lamps only in the street, and but few shops; the street is, therefore, after an early hour of the evening, almost entirely without artificial light, excepting that which it derives from the public gaslights.

The patentees stating that, by the application of their process, equal light would be given with half the ordinary consumption of gas, the burners were regulated accordingly.

The lamps experimented upon were twelve in number—six upon the western side, which were fitted with the ordinary batswing burners, calculated to consume, upon the average of the night, 5 cubic feet of gas per hour; and six upon the eastern side, fitted with batswing burners, calculated to consume 2½ cubic feet per hour; the latter burners having attached to them the carburating apparatus of the company. Each of the twelve burners had a meter attached to it, to ascertain the actual consumption. No pressure regulators were fixed upon the lamps.

The registration commenced upon the 19th of June, and terminated on the 19th of July inst.—the experiment extending, therefore, over thirty nights—and gave the following results:—That the burners without the carburating apparatus consumed about 4·39 cubic feet per hour. That the burners fitted up with the carburating apparatus consumed 2·09 cubic feet per hour.

No photometer was employed; the equalization of the amount of light given by the two classes of burners was a matter of judgment. The district inspector of the commission, who saw the light nightly, reports his opinion that the light given was perfectly equal, and that his opinion is strengthened by collecting those of certain residents in the neighbourhood. My own opinion is that the light of the 2½-feet burners was, upon the average of the month, inferior, although but very slightly so, to that of the 5-feet burners. The inspector of the Chartered Company coincides with me in this. No chemical analysis was made of the naphtha used, but it is stated by the patentees to have been of the best quality.

My deduction from the experiment is, that with naphtha of equal quality to that used during the warm months of the year, 3 cubic feet of carburated gas may be considered as about equal to 5 cubic feet of gas not carburated.

Assuming this to be data applicable to all seasons of the year, I have estimated the saving to be effected by the process; and, after allowing for the cost of the apparatus, and for periodically filling it with naphtha, and after giving credit, at the present price of the gas supplied to the public lamps, for the quantity not consumed, it shows that the reduction in the cost of each public lamp will be at least 20s. per annum; and, there being 2825 lamps within the city, that a saving of about £2825 would be annually effected.

The only disadvantage observed during the experiment was, that the reservoir, as constructed, throws a disk of shadow round the base of the gas-lamp standard; but the depth of shadow is but slight. This disadvantage may be largely rectified by an alteration in the form of apparatus.

It should be understood that I do not pledge myself to any of these figures as exact, for the experiment, as conducted, cannot lay claim to be considered minute or exact in its character; but I believe it may, nevertheless, be taken as giving a close approximation to the truth. It is the mean of the rough results of practice, and the refined processes of the laboratory, from which reliable data are generally drawn. In this case, the results of the experiment are supported by laboratory experiments, and, consequently, there seems but little doubt that this mode of applying naphtha to the public lights (for the naphthalization of gas itself is by no means new) may lead to a considerable reduction in the cost of public lighting; but what that reduction ultimately would be, would depend upon points which can only be determined by the application of the process to a considerable number of lamps for some length of time, and at different seasons.

LORD REDESDALE'S SALE OF GAS ACT.—On Friday last, an establishment which has been provided by the justices of the peace of the City for the purpose of testing gas-meters under the above Act, was opened. In this establishment (situate in Lower Whitecross Street) there are not only ample means for testing gas-meters required in the City, but the inspector states that the machinery under his control is capable of testing the whole of the meters manufactured in the metropolis. On this occasion, a series of experiments were made upon variously constructed meters, in the presence of the late Lord Mayor, Mr. Alderman Carter (who took particular interest in the operations, and put many questions), Alderman and Colonel Wilson, Mr. Alderman Dakin, and other civic functionaries. Arrangements are made for the reception of copies of standard gasholders, similar to those in the possession of the Comptroller-General of the Exchequer. These copies will be deposited in a separate department, constructed expressly for their reception. This department attracted the especial notice and admiration of all present. In the model-room there is a capacious gas-meter of highly-finished workmanship to register the consumption of gas used in testing the meters.

DEATH BY THE EXPLOSION OF A PARAFFIN LAMP.—Mr. G. S. Brent, Deputy Coroner for West Middlesex, instituted an inquiry, on Wednesday last, at the Bank of England Tavern, Cambridge Place, Paddington, into the circumstances attending the death of Mrs. Mary Ann Stokes, aged thirty-six years, late resident of 18, Desborough Place, Harrow Road. It was shown from the evidence of several witnesses that, on the 26th ult. deceased, while in the act of trimming a paraffin lamp, accidentally dropped a lighted lucifer match into the fluid, by which it was ignited, and an explosion followed. The burning fluid set fire to the apartment and to the clothes of the deceased. Her husband being in the room at the time, in his efforts to extinguish the flames, got very severely burned. The shrieks of Mr. and Mrs. Stokes alarmed the neighbourhood, and quickly brought the assistance of a number of persons as well as two fire-engines. After some difficulty the fire was subdued, and the two unfortunate sufferers were removed to St. Mary's Hospital, where Mrs. Stokes died on Thursday from the effects of the injuries she had sustained; and Mr. Stokes still remains with but faint hopes of recovery. It was generally admitted by the jury and others, that paraffin lamps were very dangerous, in consequence of the explosive nature of the spirit used. Verdict, "Death from burns, caused by the accidental bursting of a paraffin lamp."

DR. J. NORTHCOTE VINEN'S FORTNIGHTLY REPORT ON THE GAS SUPPLIED BY THE SURREY CONSUMERS COMPANY.—

Week ending.	Number of Observations.	Maximum Light. Candles.	Minimum Light. Candles.	Average Light. Candles.
July 20	4	14·90	12·55	13·80
„ 27	4	14·05	13·27	13·72
Aug. 3	4	14·92	13·99	14·50

The average volume of hydrocarbons was 5 per cent.; carbonic acid, 1 per cent.; sulphuretted hydrogen, none. Ammonia was present on July 15, 19, 22, 27, 29, and Aug. 2. The maximum pressure was 2 inches and 2/10ths; the minimum, 2/10ths. The ordinary working pressure averaged rather less than 5/10ths of an inch.

REPORT AND BALANCE-SHEET OF THE PHŒNIX GASLIGHT AND COKE COMPANY.

The following is the report for the half year ending at Midsummer, 1861, to be submitted to the proprietors at the next half-yearly meeting:—

The directors submit to your consideration, as usual, the trade account for the half year ending at Midsummer last, together with the balance-sheet at the same period.

A new coal store, and much new machinery are in the course of erection at the Vauxhall Station, and a great length of new main of large calibre has been laid in various parts of the district. The outlay for these extensions will amount to about £16,000, which, added to the outlay of £24,406 during the last year, will form a total expenditure of about £40,400 in two years. To meet which, the sum of £17,495. 11s. has already been provided, leaving about £23,000 still deficient. With the view of raising the greater part of this deficiency, the directors hereby give notice that it is their intention to propose a call of £2 per share, payable on the 21st of October next.

During the last half year, a net profit of £24,394. 15s. 7d. has been realized. Out of which sum your directors recommend that a dividend for the half year at the rate of 9 per cent. per annum be declared; or a sum, with the income-tax, of £22,242. 14s. 8d. This, deducted from the above, will leave an amount of £2152. 0s. 11d. to be added to the undivided balance of £4681. 5s. 4d., making a total of £6833. 6s. 3d. undivided.

Dr. *Abstract of the Trade Account, for Six Months, ending Midsummer, 1861.* *Cr.*

For Coals used	£29,451	15	6	By Rental for light	£63,101 18 10
Tradesmen's bills, for materials supplied	6,926	8	10	Coke made for sale	14,186 16 7
Law expenses	266	1	10	Breeze, ditto	206 10 9
Meters and repairs	1,157	5	0	Tar, ditto	1,623 19 1
Rent, rates, and taxes	2,635	7	7	Ammonia, ditto	1,083 8 10
Directors, £750; auditors, £50	800	0	0		
Salaries	3,413	3	6		
Wages paid	10,351	2	1		
Bad debts and allowances	556	16	11		
Balance of interest	209	17	3		
Net profit	24,394	15	7		
	£80,202	14	1		£80,202 14 1

Dr. *Abstract of the Balance-Sheet, at Midsummer, 1861.* *Cr.*

For Capital of 9000 £60 shares, £53 each paid up		£477,000	0 0	By Amount of plant at Christmas last		£437,613 6 8
Unpaid dividends		453	6 8	Add—		
Unpaid tradesmen's bills		7,927	8 3	Expended this half year in extension of works		8,228 7 0
Investment-fund		4,943	14 7			£445,841 13 8
Balance of profit and loss—				Securities for investment-fund		5,500 0 0
Undivided balance	£ 4,681 5 4			Amount due from sundries—		
Half year's profit	24,394 15 7			Midsummer quarter	£22,816 1 8	
		29,076	0 11	Arrears	2,433 8 3	
						25,249 9 11
				Amount due for coke	£2,043 10 7	
				Ditto breeze	104 15 9	
				Ditto tar	950 8 10	
				Ditto ammonia	538 3 8	
				Ditto sundries	1,181 1 0	
						4,827 19 10
				Stock of coals	£6,622 2 3	
				Ditto coke	33 10 0	
				Ditto breeze	7 10 0	
				Ditto tar	308 9 6	
				Ditto ammonia	113 17 0	
				Ditto retorts	1,440 17 0	
				Ditto meters	15,926 4 0	
						24,452 9 9
				Balance at treasurer's		13,528 17 3
		£519,400	10 5			£519,400 10 5

Price Current.

CASTINGS, PER TON.

Average Weight of Cast-Iron Gas-Pipes, per Yard.

1½ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle.	Wales.	Yorkshire, Derbyshire, and Staffordsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	3 5 0	2 10 0	2 12 6	3 0 0	3 5 0
1¼ and 2 inches Socket-Pipes	7 0 0	6 0 0	6 5 0	6 10 0	6 15 0
2½ and 3 „ „	6 10 0	5 10 0	5 15 0	6 0 0	6 5 0
4 and 5 „ „	6 0 0	5 0 0	5 5 0	5 10 0	5 15 0
6 in. and upwards „	5 15 0	4 15 0	5 0 0	5 5 0	5 10 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 15 0	5 0 0	5 5 0
„ 2nd „ cold „	6 10 0	5 5 0	5 10 0	6 0 0	6 5 0
Tank Plates, ⅜ thick and above	6 0 0	5 0 0	5 5 0	5 10 0	5 10 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount

	2 in.	1¼ in.	1½ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 ft., perft.	1 8	1 0	0 10	0 7	0 5	0 4½
„ „ „ 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-Pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows—wrought Iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
„ „ with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets [Nipples	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	—

COALS, PER TON.

Newcastle.—Unscreened.	6s. 9d.
Whitwell Primrose	
Medomsley, Eighton Moor, and Burnhope	7 0
Pelaw	7 3
New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth	7 6
Pelton	7 9
Ramsay's Newcastle Cannel	16 0

Scotch Cannel.	45s. 0d.
Boghead, at Leith	
Kirkness, best	23 0
Capeldrae, 1st quality	20 0
„ 2nd „	12 6
Lesmahago, at Glasgow	25 0
„ „ Leith	27 6
Arniston	27 6
Wemyss	20 0
Knightswood	18 0
Pirnie	14 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton.	5s. 9d.
Chatham & Rochester	
Cork	—
Dover & Folkestone	5 9
Dublin	—
Exeter Quay	—
Ipswich	5s. 6d. to 5 9
London (Pool)	5 9
Lowestoft & Yarmouth	4 6
Lynn	—
Portsmouth & Southampton	7 0
Plymouth	7 6
Shoreham	—
Whitstable	6 3
Weymouth	—

Foreign.—Per Keel.	£24 10s. to £25. 0s.
Barcelona	
Bordeaux	16 0
Boulogne and Calais	7 10
Cadiz	£15 to 15 10
Cronstadt	12 7/6
Copenhagen	9 10
Genoa	22 0
Hamburg	£8 to 8 5
Havre de Grace	£9. 10s. to 9 15
Leghorn	—
Lisbon	£15 to 15 10
Rotterdam	£7. 10s. to 7 15
Stettin	10 5
Trieste & Venice	£23. to 24 0

SUNDRIES.

Best Newcastle Fire-bricks	per 1000	50s. 0d. to 55s. 0d.	
Cliff's Fire-bricks, at Wortley	per 1000	55 6	
Ingham's Fire-bricks, at Wortley	„	55 0	
Fire-clay Retorts	per foot run,	5s. 6d. to 7 0	
Tough Cake Copper	per ton	£95 0s. 0d.	
English Pig Lead	„	19 0 0	
Welch Bar Iron, in London	„	6 5 0	
Tarred Rope Yarn			per cwt. 26s. 0d.
Foreign Spelter	per ton	£17 0s. 0d.	
English Block Tin	„	114 0 0	
Banca	„	113 0 0	

LEONI'S Patent Adamas Gas-BURNERS (secured by Her Majesty's Royal Letters Patent), are entirely free from liability to CORROSION, injury from Heat, or danger of Fracture, and are UNALTERABLE in the dimensions of their Apertures.

Uniformity in the consumption of Gas is obtained by the process of manufacture, which ensures that the Burners shall be of precisely similar pattern.

The Adamas Burners are confidently recommended to Gas-Fitters, Consumers, and Companies.

Sole Manufacturer and Patentee in Great Britain, S. LEONI, Adamas Works, St. Paul Street, New North Road, LONDON, N.

Now ready,

VOL. IX. of the JOURNAL of GAS LIGHTING, WATER SUPPLY, and SANITARY IMPROVEMENT, for 1860, price 21s., bound in cloth and lettered. A few copies of Vols. II., III., IV., V., VI., VII., and VIII. are still on sale.

W. B. KING, 11, Bolt Court, Fleet Street.

ROBERT MACLAREN and CO., EGLINTON FOUNDRY, GLASGOW, Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

EDWIN DIXON,

WOLVERHAMPTON PATENT WROUGHT-IRON TUBE WORKS,

Originally established in 1833,

Manufacturer of Gas and other Tubes, Fittings, and articles of every description belonging to Gas, Water, or Steam.

E. D. had the honour of receiving the

PRIZE MEDAL

warded to this Manufacture by the COUNCIL of the GREAT ENGLISH EXHIBITION of 1851; and from he latter date has supplied many towns exclusively with GALVANIZED and other Tubes for Gas and Water, under GOVERNMENT ENGINEERS.

A City, containing 150,000 inhabitants,

has recently been entirely supplied with Tubes made at the above-named Works, and several others with populations nearly as great; in fact, the reputation now acquired induces this notice to the public.

Large Stocks generally on hand, averaging from one to three hundred thousand feet.

HYDRAULIC PRESS TUBES,

to resist 6000 lbs. and upwards to the square inch, extensively manufactured.

STOCK DIES and SCREWING TACKLE

of the best possible descripton.

Every Tube carefully tested with Hydraulic Pressure before leaving the Works.

TO the Benevolent and Humane.—The undersigned, who is 74 years of age, and has been engaged for about 30 years by several of the Metropolitan Gas Companies in the capacity of Inspector, Surveyor of Mains, and Collector, has lost the use of his eyes by Cataract, and must undergo a critical surgical operation, to prepare for which he will have to incur an expense totally beyond his means. He is consequently compelled to appeal to the generous hearts of his former Brother Officers and Superiors to lend him a helping hand in this sad affliction, and to assist him in recovering one of God's greatest blessings. To those Gentlemen who have generously assisted him during the last twelve months, he tenders his most grateful thanks. The Editor of the JOURNAL OF GAS LIGHTING is acquainted with the particulars of the case, and has kindly permitted reference to be made to him; and it is hoped that the young and able will send their mite to assist in alleviating the sufferings of an old Member of the Profession.

JOSEPH WAKEMAN.

No. 2, Upper Johnson St., Holywell St., Westminster, March 5, 1861.

The following subscriptions are gratefully acknowledged:—

* Mr. Richards, Barcelona	£2	0	0
Mr. Clark, Haggerstone	1	1	0
Mr. Jones, Stepney	1	1	0
Mr. Starke, Woolwich	1	1	0
Messrs. Parkinsons, City Road .	1	0	0
Mr. Rait, Kingsland		10	0
Mr. Mann, City.....		10	0

* Erroneously stated, in a former advertisement, as £1.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

THOMAS EDGE,

MANUFACTURER OF PATENT WET AND DRY GAS-METERS,

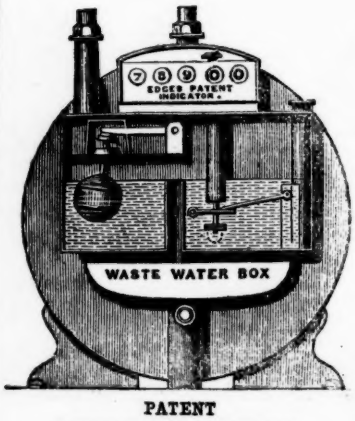
AND GENERAL GAS APPARATUS AND FITTING WORKS,

59, GREAT PETER STREET, WESTMINSTER, LONDON.

Station Meters, Experimental Meters, and Gasholders; Governors, Pressure Registers, By-pass and Slide-Valves, Photometers, &c.

Important Notice.

No. 1.



PATENT LEVER-VALVE WET METER

Engraving No. 1.

THOMAS EDGE'S Lever-Valve Meter, with Water-Box, to preserve the proper water-level (or measuring-chamber), has now, by the Sale of Gas Act, become the standard Water-Meter for universal use in the United Kingdom. With the addition, in proof of the exclusive advantage of his Meters, that all the common Meters now in use by all Gas Companies, are, by the same Act, condemned to be taken down, and altered to the same principle of regulating the Water-Line. Thousands of these improved Meters have been already manufactured by Mr. Edge.

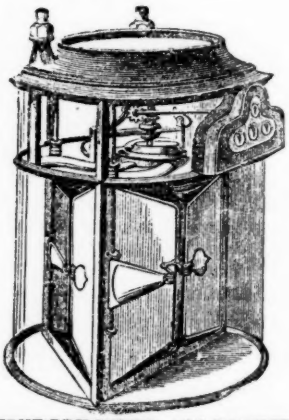
*** The Prussian Government have passed a Law, requiring the same description of Water-Meter to be used throughout that kingdom.

Engraving No. 2.

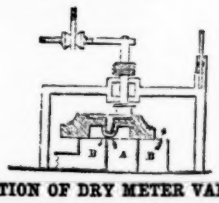
THOMAS EDGE, having patented the first Dry Meter ever invented in this country, has, of late years, discovered the serious defects of the imperfect slide-valve used in all other Dry Meters, which soon allows the gas to pass without being registered by the index; he has, therefore, substituted the very beautiful, action of the Eccentric Rotary Valve, which, by the peculiarity of its movement, has a constant tendency to wipe its surface clean and bright—thereby preventing the possibility of any gas passing without being registered by the index.

This Improved Dry Meter, in addition to its other advantages, can be fixed in warm Kitchens, Sitting-Rooms, or even Bedrooms, it being equally adapted to warmth or to the most intense cold—they having for several years been in constant use in Norway, Sweden, Denmark, &c., &c.

No. 2.



PATENT DRY METER, with ECCENTRIC ROTARY VALVE.



SECTION OF DRY METER VALVE.

GAS-WORKS ERECTED FOR LIGHTING TOWNS, MANUFACTORIES, NOBLEMEN'S & GENTLEMEN'S MANSIONS, ETC.

LESLIE'S PATENTS: Gas and Coke from common Coal, greatly increased in value.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: Up to Forty Candle Gas.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: Licenses for England, Scotland, and Ireland, the 86 Departments of France and Belgium.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: The National Waste Heaps at Collieries UTILIZED for Gas purposes.—60, Conduit Street, LONDON, W.

BELGIAN CLAY RETORTS.

ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Albert Keller, of Ghent, begs to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by him. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communiations, addressed to ALBERT KELLER GHENT, will receive immediate attention.

SAMUEL CUTLER, Gasholder MAKER and CONTRACTOR

For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.

PROVIDENCE IRON WORKS,
MILL WALL, POPLAR. LONDON, E.
Main Laying and Gas-Works erected complete.

GEORGE BOWER, GAS ENGINEER, MANUFACTURER, AND CONTRACTOR,
ST. NEOT'S, HUNTS.

References to between 100 and 200 Gas-Works Designed and Erected by the Advertiser.

WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE,
MANUFACTURERS OF EVERY DESCRIPTION OF
FIRE BRICKS, CLAY RETORTS, LUMPS, TILES, *&c. &c.*

LONDON OFFICES:
76, KING WILLIAM STREET, CITY.
A large stock of Fire-Clay Goods always on hand in London, at the lowest wharf prices, at Messrs. CHRISTIE & Co.'s Wharf, 64, Bankside, SOUTHWARK.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.
MANUFACTURERS OF
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AMBLECOTE FIRE CLAY AND BRICK WORKS, STOURBRIDGE.
Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.
NB. A quantity of best Clay Retorts in stock, viz.—Circulars, 14 inches, 15 inches. 16 inches. D's, 16×12, 15×14, 20×16, 16×18.

JAMES NEWTON,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANT,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE, SOUTHWARK, LONDON.
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and CLAY, and every Article suitable for
GAS AND WATER WORKS.

WILLIAM BLEWS AND SONS'
IMPROVED MACHINE-MADE BURNERS
WROUGHT-IRON BATSWINGS,
FOR RAILWAY STATIONS AND MARKETS,
GAS-FITTINGS, CHANDELIERS,
BRASS AND IRON TUBES OF EVERY KIND
SUPPLIED ON THE BEST TERMS,
AT THE WORKS,
9, 10, 11, BARTHOLOMEW STREET, BIRMINGHAM.

GEORGE CUTLER & CO.,
GAS ENGINEERS, &c.,
London Gasholder and Boiler Works,
8, WHARF, WENLOCK ROAD, CITY ROAD, N., LONDON.

Rye, Nov. 12, 1860.

Dear Sirs,—I consider it incumbent on me to acquaint you that the alterations recently made on the Rye Gas-Works—viz., the addition of a NEWLY-IMPROVED WASHER, and other work for the Purification of Gas, executed by the experienced workmen under your able supervision—are perfectly satisfactory to the Company, and the Gas is now as pure as it can be made.

I am, dear Sirs, your obedient servant,
CHARLES THOMAS, Superintendent,
Rye Gas-Works.

Messrs. Cutler and Co.

PHŒNIX GASLIGHT and COKE COMPANY.

NOTICE is hereby given, that the ADJOURNED HALF-YEARLY GENERAL MEETING of PROPRIETORS, holding, previous to May 21 last, Five Shares and upwards in the said Company, will be held, pursuant to the Act of Incorporation, on WEDNESDAY, the 21st instant, at Twelve for One o'clock, at the Bridge House Hotel, in the Borough of Southwark, for the purpose of declaring a Dividend to Midsummer last, and on other business.

By order of the Court of Directors,
CHARLES PRIDDEN, Secretary.
70, Bankside, Southwark, S.E.
August 13, 1861.

The Half-Year's Dividend, will be clear of Income-Tax, and will be payable immediately after the business of the meeting has terminated; and afterwards at the Company's Office, at Bankside, on Thursday, the 22nd inst., and also on Monday, the 26th inst., on both days from the hour of Twelve till Three, and from that time on Wednesdays only, from Two till Four o'clock.

F. SIMMONDS and SON,
RETORT AND BOILER-SETTERS,
AND CONTRACTORS FOR GAS-WORKS IN GENERAL, FOR MATERIALS AND LABOUR, OR LABOUR ONLY.
OFFICE:
2, YORK PLACE, KINGSLAND ROAD, N.E.
Contractors at the Chartered Gas-Works, Curtain Road, and numerous Provincial Gas-Works.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

WEST and GREGSON, Gas-Meter MANUFACTURERS, &c.
UNION STREET, OLDHAM.

Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

W. C. HOLMES & CO.,
GAS ENGINEERS,
WHITESTONE IRON WORKS, HUDDERSFIELD.

Manufacturers of Gas Apparatus, Gasholders, Iron Tanks, Roofs, &c. &c.

Contractors for the Erection of Gas-Works throughout of any magnitude.

Plans, Specifications, and Estimates prepared.

Makers of the Combined, Condensing, and Purifying Apparatus (especially adapted for exportation), uniting simplicity and compactness with great efficiency and facility of working.

References given to Works where it is in operation.

STOURBRIDGE FIRE-CLAY WORKS.
E. BAKER and CO.
(Contractors to Government).
24 WHARF, HARROW ROAD, PADDINGTON, W.
Every article manufactured at their own Works and Mines, Brierley Hill.

FIRE-BRICKS, Lumps, Squares, Tiles, and Gas Retorts of all dimensions.
CRUCIBLE and CEMENT CLAYS.
GARDEN EDGINGS, of various patterns.
BUFF and ORNAMENTAL TILES.
CLINKERS and STABLE PAVINGS, noted for hardness and durability, being perfectly non-absorbent.

Shipments on the shortest notice.

ESTABLISHED 17 YEARS.

OFFICE for the Procuration of LETTERS PATENT, and the REGISTRATION of DESIGNS. JOSEPH WILLCOCK and Co., Patent Agents and Engineers, Successors to Messrs. Barlow and Co., 89, Chancery Lane, LONDON, W.C.

GRATIS, and post free, "THE INVENTOR'S MANUAL;" also a pamphlet, "*L'Obtention de Patentes Anglaises;*" 500 MECHANICAL MOVEMENTS; the first part of Kinematics, or the Transformation of Motion. By JOSEPH WILLCOCK, C.E., Mem. Soc. of Eng. May be had at the above address, and of any Bookseller. Price 2s. 6d. The second part is approaching completion, and will shortly be announced.

CAUTION.
TO GAS-METER MANUFACTURERS AND OTHERS.

THE Undersigned hereby caution Meter Manufacturers and others against infringing the exclusive right of the Undersigned to the use of the Screw Adjustment for regulating the Height of the Overflow-Pipes in Wet Gas-Meters, as described in the Specification of the Letters Patent granted to Crosley and Goldsmith on the 19th of April, 1856; as well as against infringing any other portions of that or any other Patent of the said William Crosley; and

NOTICE is further given, that all Infringers of the said Inventions, or any portions of them, will be proceeded against.

CROSLEY & CO.,
103, SOUTHWARK BRIDGE ROAD,
LONDON, Aug. 29, 1859.

WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,
GLOBE PATENT TUBE WORKS,
WEDNESBURY,

Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.

Orders promptly executed.

TO Mr. BENJAMIN WHITEHOUSE,
GASHOLDER MAKER,
WESTBROMWICH, NEAR BIRMINGHAM.

Sir,—I feel great pleasure in expressing my satisfaction at the manner in which you discharged your duties as CONTRACTOR for the TELESCOPIC GASHOLDER, 150 feet diameter and 60 feet deep, erected at this Company's Nine Elm Station in 1857. From that period to the present I have closely watched its working, and have never found the least defect either in workmanship or material.

During the recent heavy gales the Gasholder, although containing upwards of 1,000,000 cubic feet of Gas, showed no perceptible indications of its influence, but worked as freely and easily as usual.

RICHARD JONES.
Engineer to the London Gaslight Company.
Vauxhall, London, Nov. 9, 1859.

WALTER MABON, Engineer,
ARDWICK IRON WORKS, FAIRFIELD STREET
MANCHESTER,
Manufacturer of
IRON TANKS for Gasholders, Railway Stations, &c.

GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.

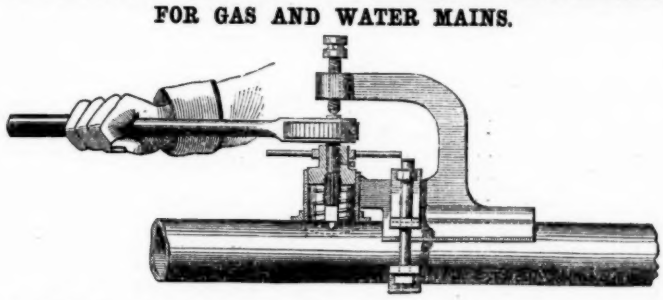
GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.

WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.

IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.

PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

UPWARD'S PATENT DRILLING APPARATUS
FOR GAS AND WATER MAINS.



No. 1.—RATCHET BRACE, DRILL POST, CLIPS, BOLTS, TAP DRILL, & NUT, for ¾, 1, 1¼ in., £9 1 0
No. 2.— Ditto Ditto Ditto Ditto, for 1½ in., and 2 in., 10 6 0

MADE BY
BRYAN DONKIN AND CO., ENGINEERS,
NEAR GRANGE ROAD, BERMONDSEY,
SOLE LICENSEES.

TRUSS'S PATENT ELASTIC PIPE-JOINT,

FOR GAS AND WATER-MAINS, AND STEAM PIPING,

Is the only PERFECT joint that has ever been constructed, and supplies the long-felt desideratum, by allowing for the expansion and contraction of metals, and for oscillation and deflection, without impairing the joint. Gas Companies will effect an incalculable saving in adopting it, as compared with the present imperfect mode of jointing.

Drawings, Estimates, and every particular, furnished on application to

THOMAS SEAVILLE TRUSS, C.E., 53, GRACECHURCH STREET, LONDON, E.C.

R. LAIDLAW & SON,

GAS ENGINEERS, IRON & BRASS FOUNDERS,

Alliance Foundry, 147, East Milton Street, and Barrowfield Iron-Works,

GLASGOW;

AND AT SIMON SQUARE, EDINBURGH;

MANUFACTURERS OF

STATION & CONSUMERS METERS, ALL SIZES;

WROUGHT-IRON TUBES, FOR GAS, WATER, & STEAM; CAST-IRON RETORTS & PIPES;

HYDRAULIC MAINS, CONDENSERS, WASHERS, SCRUBBERS, PURIFIERS, & TANKS.

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GOVERNORS, SLIDE-VALVES, &c.;

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Contractors for Gas-Works of any Magnitude. *Plans, Specifications, and Estimates furnished.*

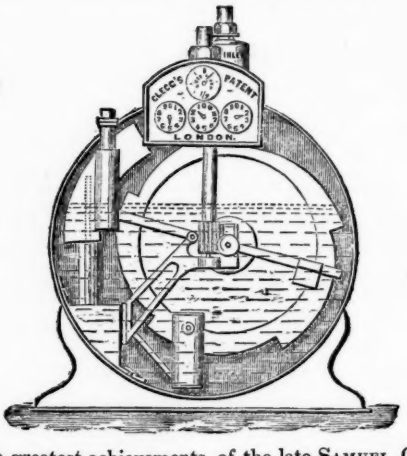
CLEGG'S
NEW PATENT HYDRAULIC GAS-METER.

BISCHOFF, BROWN, & CO.,

MANUFACTURERS

AND

SOLE LICENSEES,



LANGHAM WORKS,

GEORGE STREET,

GREAT PORTLAND STREET,

LONDON, W.

This Meter is the last and one of the greatest achievements of the late SAMUEL CLEGG, C.E., in his connexion with the Manufacture and use of Gas, and, without presumption, it may be confidently affirmed to be the only Meter extant that can be relied upon to measure correctly, to work with the minimum of pressure, and steadiness of light. It cannot be tampered with by tilting or otherwise, and will be of great durability.

This Meter is constructed on an entirely new principle, and, when once adjusted, will always remain the same under all circumstances. The quantity or height of the water in it has no effect on its *capacity*. The immense importance and economy of this to Gas Companies who are obliged to employ so many inspectors, doing their utmost to prevent tampering with the Meters, is so obvious, that they will be able to appreciate its advantages over all other Wet Meters, where the varying height of the water regulates the capacity, and is, in consequence, a perpetual source of annoyance, bad feeling, and litigation, between the Gas Companies and consumers.

The following experiments clearly point out our advantages, and can be readily tested:—

Old Water Meter.

2 pints above the line	..	5 lights	..	13½ per cent. fast.
1 " "	..	5 "	..	7½ " "
Water on the line	..	5 "	..	⅛ " "
1 pint below the line	..	5 "	..	5 " slow.
1½ " "	..	5 "	..	7½ " "
1¾ " "	..	5 "	..	10 " "

A fluctuation of 23½ per cent.

Clegg's New Patent Hydraulic Gas-Meter.

Water on the line	1 inch pressure	5 lights	½ per cent. slow.
1 pint below	1 " "	5 "	½ " "
2 " "	1 " "	5 "	½ " "
2 " "	1½ " "	5 "	right
2 " "	½ " "	5 "	"

A fluctuation of ½ per cent.

The Drum, from its peculiar construction, presents scarcely any resistance when moving through the water; and, its weight being taken off its axis by an air vessel, it revolves with the slightest pressure.

The comparative absence of friction in the Drum reduces the wear and tear, and enables it to be made of the strongest materials, which will keep it in working order longer than any other Meter.

It is approved and adopted by the principal London and Country Gas Companies, and is guaranteed to comply with the "Sale of Gas Act," as this Meter, beyond all doubt, works within a shorter range of registration than any other Meter manufactured.

500
HOLMAN'S PATENT DOUBLE-ACTION PUMPS

Prove their general adaptation. They are adopted by

CIVIL, MARINE, MANUFACTURING, AND MECHANICAL ENGINEERS.

For Pumping TAR, AMMONIACAL LIQUOR, WATER, WORT, and other fluids, their intrinsic excellence is too well known to need description.

S. HOLMAN tenders his hearty thanks to all Patrons, and is prepared to undertake the Supply of Towns, Public and Private Establishments, and Irrigation of Lands, on any scale.

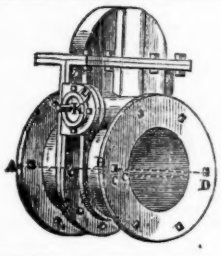
Sole London Agent of the Williams's Perran Foundry Company, for the Sale of Cornish Pumping, Winding, and other Steam-Engines, heavy Machinery, Castings, and Forgings.

London Agent for Tangye's Patent Hydraulic Presses, Jacks, Lifts, Crabs, Cranes, Blocks, &c

ALL KINDS OF HYDRAULIC AND STEAM MACHINERY FOR HOME USE OR EXPORT.

Cornish Boilers of superior construction, Steam-Cocks, Gauges, and Fittings.

S. HOLMAN, C.H.E., 18, CANNON STREET, E.C.



BRYAN DONKIN & CO.

keep always on stock their

IMPROVED GAS VALVES

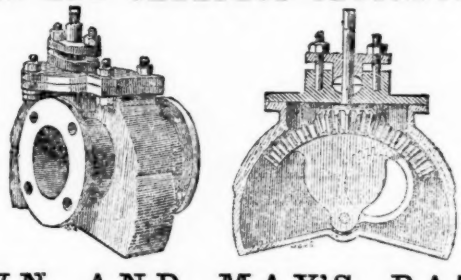
from 2 inches to 18 inches, price 11s. 6d. to 13s. 6d. per inch diameter

List of prices, with full dimensions of all sizes up to 27 inches, to be had on application.

These Valves are all proved to 30 lbs. on the square inch before leaving the works.

BRYAN DONKIN & CO.,
ENGINEERS,
NEAR GRANGE ROAD, BERMONDSEY.

BEST AND CHEAPEST SLUICE-COCK.



BROWN AND MAY'S PATENT.

Above 3-inch diameter, price 10s. per inch. Brass face, 6d. per inch extra.

Can be taken to pieces without being removed from the line of Piping.

NORTH WILTS FOUNDRY, DEVIZES.

Wholesale Agents, Messrs. S. and E. RANSOME, 31, Essex Street, Strand, E.C.,
Where a Sample may be seen.

WALTER FORD,

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PADDON and FORD,

GAS-METER AND APPARATUS WORKS,

GRAY'S INN ROAD, LONDON.

MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.

A large number of **STATION-METERS,** up to 80,000 feet per hour (being by far the largest in use), and **GOVERNORS** for **MAINS**, up to 24 inches, have been constructed by Paddon and Ford. These Meters and Governors possess peculiar advantages as regards strength and freedom of action.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

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28, BAGNIGGE WELLS ROAD, CLERKENWELL,

PATENTEE OF

DRY & IMPROVED WET GAS-METERS,

AND

GAS APPARATUS.

All Meters warranted to comply with the Act of Parliament.

F. & C. OSLER,

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Manufactory—Broad Street, Birmingham—Established 1807,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards (Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of Gas in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

WILLIAM RICHARDSON

(LATE OF DUDLEY).

CONSULTING ENGINEER,

PATENTEE OF THE VERTICAL OVEN RETORT

No. 367, PERSHORE ROAD,
BIRMINGHAM.

JAMES OAKES and CO.,

ALFRETON IRON WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

C. H. is prepared to carry out the warming and ventilation of public buildings, &c.; also civil engineering in general.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,
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Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

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NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

LONDON HOUSE:
12, ROYAL EXCHANGE BUILDINGS.

GAS COAL.

BEAL, WALKER, and CO., Coal and

COKE MERCHANTS, No. 1, Walker's Buildings, SHEFFIELD, beg to inform the Directors and Managers of Gas Companies, that they are in a position to contract for the supply of the different sorts of best Gas Coal, such as best Silkstone, Barnsley, and others, at the lowest prices, which may be had on application at the above Office.

ALFRED PENNY, Gas and

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WENLOCK IRON WORKS,
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Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.

Plans, Specifications, and Estimates prepared.

Gas Stoves, Gas Baths, Gas Cooking

APPARATUS, warranted the best in England, at PHILLIPS's, the original inventor and manufacturer, and general gas-fitter, &c., 55, Skinner Street, Snow Hill, LONDON, E.C.

PATENT SAFETY ATLAS CHANDELIERS, Sun and Star Burners, Outside Lamps, Patent Reflecting Lamps, Portable Coppers for either Gas or Fuel. Iron Tube and Fittings. Best quality for Gas, Steam, or Hot Water, &c. &c.

GEORGE ANDERSON, Gas and

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DIRECT-ACTING GAS-EXHAUSTERS,

supplied either with or without Steam-Engines and Boilers.

FOUR-WAY DIAPHRAGM VALVES,

one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.

RETORT SETTINGS,

designed to be heated by Tar alone, and with a total absence of Smoke.

Illustrated circulars, giving references and every information, may be obtained on application as above.

BENJAMIN GIBBONS, Jun.,

DEEPDALE FIRE-CLAY & BRICK WORKS,

Near DUDLEY,

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS,

TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

WILLIAM INGHAM AND SONS,
WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of
RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,
beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.
The Works are of such magnitude as to ensure the prompt execution of orders to any extent.
Estimates for Setting, or Bricklayers sent when required.
GAS OVENS IN SEGMENTS OF EQUAL QUALITY.
A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.
N.B.—*Export orders continue to have prompt attention.*

EDWARD COCKEY AND SONS'
PATENT GAS VALVES.

These Valves are formed of two Cast-Iron Cylinders, with segmental divisions, having the faces ground gas-tight—the upper Cylinder turning horizontally on the lower one.

The lower Cylinder has pipes from each division, communicating with the vessels to and from which the gas is to be passed. The upper Cylinder has corresponding divisions, so arranged as to direct the passage of gas to the different segmental divisions in the lower part, and when it is turned on the face of the lower one, to alter the flow of gas from one vessel to another.

Each Valve has an index-plate provided, which is to be attached to the floor, and a pointer on the cover of the Valve shows which way it is turned. Thus, the Manager of the Works can at once see in which direction the gas is passing.

There are about fifty of these Valves now in use, of sizes varying from two to twelve inches, and they are giving great satisfaction. Amongst the Works at which they are fixed, the following may be mentioned:—

BASINGSTOKE.	CANTERBURY.	FROME.	RYDE.
BLANDFORD.	ENNISCORTHY.	GODALMING.	SANDWICH.
CHELTENHAM.	ELGIN.	NEWPORT.	WARMINSTER.

They are in course of erection at other important Works.

IRON WORKS, FROME SELWOOD.

EDWARD COCKEY AND SONS
ALSO MANUFACTURE
PURIFIERS, SCRUBBERS, CONDENSERS, AND OTHER IMPROVED GAS APPARATUS,
HAVING PATTERNS SUITABLE FOR GAS-WORKS OF DIFFERENT SIZES.

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MANUFACTURER OF
PATENT DRY AND WATER GAS-METERS, TEST GASHOLDERS, AND APPARATUS,
"EVANS'S" PHOTOMETERS,
Experimental Meters, Minute Clocks, &c., Station Meters and Governors,
STREET-LAMP GOVERNORS AND LAVA BURNERS,
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FIRE-CLAY GAS RETORTS,

Made of the most refractory Clay in the world, possessing extraordinary properties of contraction and expansion without cracking; having a true form, and perfect internal smoothness.

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Made up to five feet diameter. Vitrified Pipes, for conveying Water under pressure, made, laid, and guaranteed to stand a required pressure for six months. Every description of sanitary goods.

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CROSLEY & GOLDSMITH'S

PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS

CANNOT BE OVER OR UNDERCHARGED WITH WATER,

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable.

MANUFACTURED BY

CROSLEY & CO.,

GAS-METER MANUFACTURERS,

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N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENT METERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c., &c., similar to those used by Mr. King, of Liverpool.

CROSLEY & CO. are also prepared to supply Gas Companies and others with

DUPLICATES of Mr. KING'S CUBIC FOOT TRANSFERRER,

similar to that manufactured by them, and verified by the ASTRONOMER ROYAL, and PROFESSOR MILLER, of Cambridge, on behalf of the Government, which was deposited by C. & Co. in the Office of the COMPTROLLER-GENERAL of the EXCHEQUER before Nov. 13, 1859, in compliance with the "Act for Regulating Measures used in Sales of Gas." They also supply

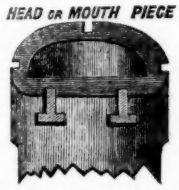
TEST GASHOLDERS,

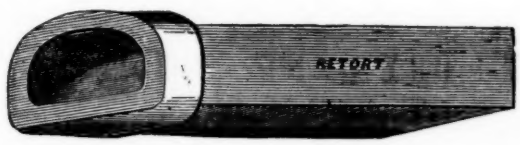
Graduated by the Standard Cubic Foot.

C. and Co. are the only house in the trade which has for years manufactured Meters according to the standard measure set forth in the 2nd Section of the "Sale of Gas Act," and which also comply with the rules laid down in the Section for testing meters. Purchasers of C. and Co.'s Meters may therefore be secured against any additional expenses being incurred in order to adapt their Meters to the requirements of the new Act.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.





KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

THE WORKS ARE WELL SITUATED

For EXPORT from the Ports of { LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.

FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

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CROLL, RAIT, AND CO.,

Manufacturers of Croll's Patent Improved

DRY GAS-METER,

Are prepared to supply their Meters duly stamped, under the authority of the Sale of Gas Act, 22nd and 23rd Vic., Cap. 66.

Fees for Stamping charged on Invoice.

FACTORY:

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55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.,

MANUFACTURER OF

CONSUMERS' COMPENSATING & NON-COMPENSATING WET GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

"Analysis of Gas for Practical Men," by A. WRIGHT, M. Inst. C.E., post-free for 13 Stamps. PRICE-LISTS ON APPLICATION.

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PATENT DRY AND WET GAS-METER MANUFACTURER,

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ESTABLISHED 1836.

J. M. invites attention to his Improvements in EXPERIMENTAL WET GAS-METERS, by which he renders impossible any Leakage from the Stuffing-Box.

These METERS are GUARANTEED to meet all the Requirements of the SALE OF GAS ACT

GOVERNORS, STATION-METERS, PHOTOMETERS,

EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,

AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

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GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT-IRON PIPE, BLACK & GALVANIZED. COPPER. TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—60s. net.

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Large Pattern Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.

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